THE ENGINEERING AND MINING JOURNAL.

VOL. IX.—NO. 20.—THIRD SERIES.] NEW YORK, TUESDAY, MAY 17, 1870. [SINGLE COPIES 10 CENTS.

Howland's Patent Rotary Pulverizing and Amalgamating Quartz Mill.

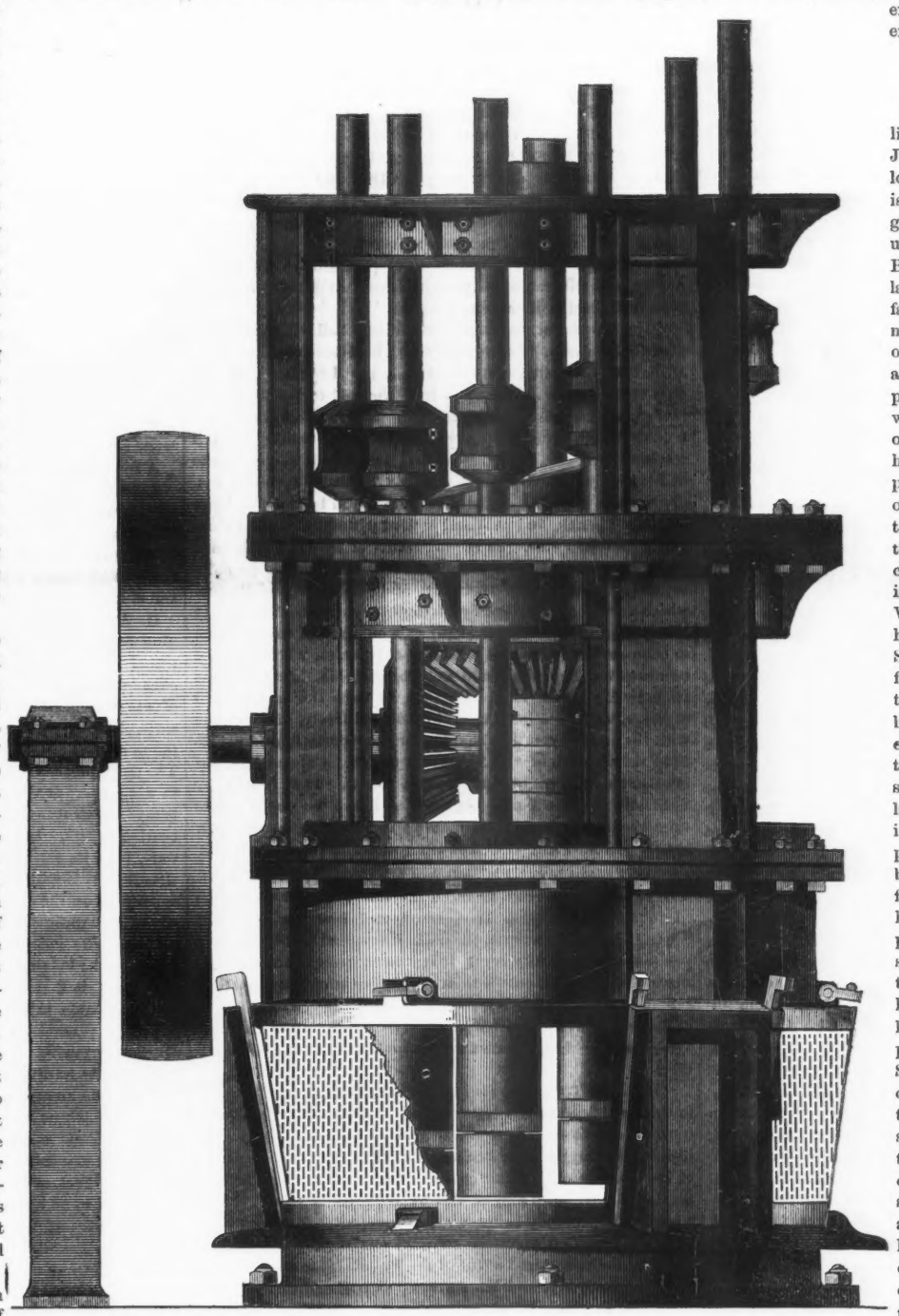
SOME months since, we published an illustration of HOWLAND'S Rotary Quartz Mill. We now present to our readers a new and much finer engraving of the same, together with the following notes upon the mill, furnished us by Messrs. MOREY & SPERRY, of No. 95 Liberty street, in this city, who are the manufacturers: This mill has been running for the last nine years with good success in California and Nevada, and has from time to time been improved to keep up with the wants of the mining interest. It is now for the first time offered to the public on this coast, as one of the best, cheapest, and most effectual pulverizers and amalgamating machines ever gotten up. It costs nearly one-half less when put up ready to run than the straight mill. It can be put up at the mine ready to run in three days; and, with good ore, will pay for itself while a straight mill is being erected. It is built in the most substantial manner and of the best material. Each mill is put running at the shop, so as to avoid all annoyance of bad fitting or lack of parts. These mills are cast in sections, so as to be easily transported. If the mine does not pay, the mill can be taken down, and removed without damage. The wearing parts are so arranged that they can be duplicated at any time. Each section is faced off, and three-eighths of an inch of wood put between, thus avoiding the loosing of nuts and bolts and the granulating and weakening effects produced by the jar.

The weight of stamps is from five to six hundred pounds. The shoes and dies are made of the best white iron. The stamps revolve while being raised by the cam, consequently there is but a small amount of friction, and as they continue to revolve until they strike the die, both the shoes and dies are kept square on the face, doing more and better work than the straight mill. The stamps, dropping one after the other, force the pulp or rock around the mill, distributing it so that each stamp has an equal amount of rock. The speed of these mills is from one hundred to one hundred and ten drops per minute. It has more screen surface than the ordinary mill, and is better protected, the rock being fed in at the hub or centre. It does not come in contact with the screens until it is partially crushed. It has been demonstrated that a light stamp and a short, quick drop does the best work, and when amalgamating in the mortar mixes the pulp and quicksilver thoroughly together, giving the quicksilver no chance to lie still until it is amalgamated with the metals, when it drops at the bottom of the screen, and is safe.

For these reasons, this mill is a much better amalgamator than the old style of mill. It is also adapted to dry crushing as well as wet. Some of the improvements made in this mill are, that it is cast in sections, while the old mill had columns; the gear is taken from the top and put nearer the base, giving less vibration; it is made much heavier; the guide-boxes for stems are of oak; the wood packing between the sections to take off the jar; besides, many other little annoyances are obviated to which other mills are subjected. These, mill-men know, are of great importance in keeping a mill running, as there is no pay coming while a mill is under repair, and the continuous stopping and starting is very detrimental to milling.

These mills are no longer an experiment; they have been proved by use for the last seven years in Australia with perfect success. They are manufactured at Sydney by Messrs. SMITH & RUSSELL, who give them the credit of being the best stamp mill built.

Messrs. MOREY & SPERRY, the manufacturers here, will furnish, upon application, any further information in regard to them. They also have models and full-sized mills on exhibition at No. 95 Liberty street, in this city.



HOWLAND'S PATENT ROTARY PULVERIZER AND AMALGAMATING QUARTZ MILL.

Nitre Caves—Saltpetre Beds in the United States.

THE production of such an important constituent of gunpowder as nitre is at times a serious concern with all governments. Some of the people of Northern Europe are compelled to pay a portion of their taxes annually on saltpetre. While the seaboard of a nation is unobstructed, there is no difficulty in obtaining supplies from foreign countries, especially from India, but a blockade compels a people in a state of war to rely upon internal resources. It has not unfrequently happened during the wars in which the American people have been engaged, to find it convenient to work up such means for obtaining nitre as the interior of the country afforded. What are called nitre or saltpetre caves, which are well known to abound in most of our States where limestone formations and their attendant caves exist, are resorted to for this purpose, as in Kentucky, Virginia, Tennessee, and other States. The loose earth is dug up from the floor of the cavern, and the soluble part of it extracted by water. The lye obtained from wood ashes is added to this to form the saltpetre, which, after properly evaporating off the water, is found in the form of crystals. Besides the old localities above referred to, the Commissioner of the General Land Office has recently obtained information of the existence of abundant deposits of the nitrous earth in several other places. Two of these are in Texas, one at the Comanche Springs, Llano county, and the other in Burnett county, on the Colorado. These deposite are all in caves, where this substance is protected from the action of rains, but in India and other places, it is not unfrequently the case that nitrous salts are obtained from the soil itself, which has been exposed to atmospheric vicissitudes for all past time, the localities being in the rainless zone. Similar deposits are reported from the vicinity of Red River, between the Wachita Mountains and the celebrated Llano Estacado, where rain seldom falls. An additional locality, lately reported, is in Churchill county, Nevada, near the Soda lake, at Raytown, where, besides nitrate of potash, an extensive bed of sesqui-carbonate of soda exists.—*N. O. Shipping List.*

Sulphur in the West Indies.

THE New York *Standard*, a new and lively daily paper, under the charge of JOHN RUSSELL YOUNG, publishes the following important paragraph: "Sulphur is a substance which has, if not a fragrant, at least a decided odor, and is useful both internally and externally. Besides these purely personal uses, it is largely used in this country in the manufacture of sulphuric acid, and for other manufacturing purposes. As a matter of course, the source of supply becomes a matter of consequence, especially to proprietors of extensive manufacturing works. Heretofore, the principal source of supply has been Sicily, which island has furnished it from the extensive deposits left by the volcanic movements observed there. We are glad, however, to know, and to be the first to announce, that a source of supply has been discovered much nearer home. It is in the island of Saba, which is one of the Dutch West Indies, and is situated about one hundred and ten miles south-east from St. Thomas, and forty miles south-west from St. Martha's. Like its Italian prototype, the island is of volcanic origin, being about eleven miles in circumference, and at its highest point about two thousand eight hundred feet above the sea. Though a Dutch possession, the language spoken by its two thousand inhabitants is chiefly English. The sulphur deposit referred to was discovered by an enterprising New Yorker, who found himself there on a search for health, and, finding indications of sulphur ore, set to work with pick and shovel, and, with the help of some natives, quarried two sloop loads, which he brought here and submitted to analysis. The report of the chemists employed is to the effect that, while the Sicily ores only yield about thirty per cent. of brimstone for the ore consumed, the Saba ore yields an average of over sixty per cent. Adding to this the fact that the island is only about fifteen hundred miles from New York, it will be seen that this is an important discovery, and it need not be wondered at that steps have already been taken to secure leases of the best tracts on this island. We understand that this has been done, and that the importation of crude brimstone will soon be commenced. Together with the Louisiana sulphur beds this mine will undoubtedly drive sicilian sulphur from our market.

Quantitative Estimation of Carbon in Pig-Iron.

ACCORDING to Dr. R. FRESENIUS, the weighed quantity of iron to be tested for carbon is placed on a small porcelain boat, and introduced into a hard glass combustion tube, placed in a combustion furnace, and, when red hot, a current of dry chlorine gas (dried by making it pass over pieces of pumice-stone moistened with strong sulphuric acid) is passed over; the current of gas and application of a low red heat is continued until all the iron is volatilised as chloride. The carbon left in the small boat is, after the apparatus has cooled, placed in a porcelain tube and burned.

After being heated to redness in a current of oxygen, the products of the composition are taken up by Liebig's pot-ash bulbs. Great care is required that the chlorine be thoroughly dry, since, otherwise, hydro-carbons may be formed and some carbon lost.

The Coal Drawback Suit.

As an addition and explanation to our remarks of last week on the trouble between the Pennsylvania and Reading Railroad Company and Messrs. LEWIS AUDENRIED & Co., we reprint in the present number the recent decision of court covering part of the questions at issue. This decision, as we understand it, is a highly important one, as settling the point that the wharves and wharf-tracks of a railroad company are part of its equipage as a common carrier; and that the company cannot attempt to coerce any of its customers into summary settlement of its claims, by denying to them the usual privileges belonging to all consignees of freight.

In the present instance, the firm referred to agreed, in April, 1869, to put one hundred and five thousand tons of coal into the Boston market during the season, provided the company would allow such drawbacks thereon as would secure to these shippers a moderate and uniform rate of tolls. This contract was made with Mr. TUCKER, Vice President of the company, and received the sanction of Mr. SMITH, then President. It was not at that time particularly favorable to the shippers, or at least not so much so as it afterwards became. The policy of the company was to secure a large business; and this arrangement gave them an extraordinary amount of Boston shipments. The contract did not affect any other market.

But the company's policy was subsequently changed, and the rates of tolls were considerably advanced, in consequence of which step, this contract became very valuable. The shipments under it were regularly made, and the drawbacks collected weekly by Messrs. LEWIS AUDENRIED & Co., without objection from the railroad company, until November, nearly at the close of the season, when the new President, Mr. GOWAN, alleged a violation of the contract on the part of the firm, and advanced a claim for the repayment of some one hundred thousand dollars of drawbacks, already received by the latter. The proposition of the firm to give bonds for the amount, and submit the whole matter to arbitration, was declined; and they were notified that they must surrender the points at issue, or lose their wharfage at Port Richmond. It is this high-handed way of settling disputes, by threatening to ruin the business of our adversary unless he gives up what he believes to be his rights, that has been stopped by the judicial decision and injunction referred to. The effect of this authoritative declaration is far greater than the amount of money immediately involved:

In the Supreme Court for the Eastern District of Pennsylvania.
IN EQUITY.
LEWIS AUDENRIED, *et. al.*, *v.* THE PHILADELPHIA AND READING RAILROAD COMPANY.

Opinion of Hon. JOHN M. READ. Delivered April 29th, 1870.

"By the Act of the 4th of April, 1833, under which the defendants were incorporated, their railroad might terminate 'at some suitable point in or near the city of Philadelphia, or on the line of the Philadelphia and Columbia, or the Philadelphia, Germantown and Norristown railroad,' and under these powers they constructed a railroad terminating on the river Delaware, at Richmond, near the city of Philadelphia. This route is distinctly recognized in the fourth section of the Act of 20th of March, 1838, (P. L. 149) in these words: 'The route already located by them for their railroad from the Falls of Schuylkill to the river Delaware." The eastern termination of the main coal line of the road is, therefore, the river. To accommodate the shippers of coal, a large wharf front, to be owned by the company, was therefore a matter of absolute necessity, and it has been acquired by the defendants, who have built wharves and piers running into the tideway of the Delaware, with branches or extensions of the railroad running down to the ends of the piers, so as to allow the coal to be emptied from the cars into the holds of the vessels.

"Bins are also provided, into which the coal can be dumped, when the vessels are not there. The branches or extensions are in fact part of the main line, and subject to the same rules and provisions, or they are branch railroads, within the meaning of the seventeenth section of the Act of 13th April, 1846, which has been extended by the Act of the 12th April, 1864, P. L. 396, to the Philadelphia and Reading Railroad Company. Black *v.* Railroad Company, 25 *Legal Intelligencer*, 1868, p. 301.

"The main line is nine hundred and eighty-four miles in length, with a double track, and all the railroads owned, leased, or controlled by the defendants have an aggregate length, including sidings, amounting to 1,142 miles of single track road. These subsidiary roads render tributary to the main line almost the entire territory of the southern and middle coal fields, one of sixty miles, and the other of over thirty miles in length.

"The capital stock of the Philadelphia and Reading Railroad Company, on the 30th November, 1869, was $29,923,-100 28; its funded debt, $7,819,592 13, and the managers have negotiated a loan of $5,000,000 of seven per cent. coupon bonds, dated January 1st, 1870, payable in twenty years, one-half convertible at the option of the holder into stock, at par, at any time after the first of January, 1872. The result of this large moneyed investment was, that in 1869 the total of all coal transported on the main line was 4,239,457 tons of 2,240 pounds, of which 2,362,972 tons were sent to Richmond for shipment.

"LEWIS AUDENRIED, one of the plaintiffs, was the first shipper of coal that occupied one of these wharves at Richmond. He took it in the year 1842, and used it till 1848, when he formed a partnership, which continued the occupancy till 1854, when the present firm (the plaintiffs in the bill) was formed, who used a wharf, or part of a wharf, till 1868, and for two years past used the wharf No. 11, as shippers of coal from that point to New York, Boston, and other ports.

"During all this time, with the exception of 1858, the plaintiffs allege that they or their predecessors, for twenty-seven years, with that single exception, have been, if not the largest, certainly among the largest shippers of coal over the road, and from these wharves, during the past year (1869) they shipped there over 213,000 tons, being an eleventh part, within a fraction, of all the coal sent there for shipment.

"LEWIS AUDENRIED, the senior partner, in his affidavit, says: 'Relying on the continuance of the usual facilities at Richmond, my firm and the several partners are involved in large engagements, to carry out which, to a great extent, equal facilities at Richmond for shipping with all others in the trade are essential. We have advanced to miners not less than $175,000, and agreed to advance not less than $100,000 more. If we are denied these usual and necessary facilities, our custom will be to a great extent broken up, or we must find coal for it elsewhere, and principally from parties who transport it over roads terminating directly in the vicinity of New York. When the company made the arrangement with us looking to an increased tonnage and business, they gave us additional wharf accommodations for the expected increase, and in consequence of this and our using these facilities to the fullest extent, it is believed the company made, in the year 1869, about $21,000 on the item of shipping our coal, a much larger profit than was made from any other individual, shipper or firm. The dispute between us and the company arises from different interpretations of the terms of a verbal contract. I never knew or believed, nor heard it asserted, that the terms were such as the company now asserts, until the shipping season was over and the drawbacks paid.'

"Since 1867 the company ships all the coal, and are paid from fifteen to twenty-two and a half cents per ton, with ten cents for dumpage, during the day of arrival, and a loss of this allowance if not so discharged, and an additional fine.

"The defendants claim there is due to them by the plaintiffs, the sum of $87,993 33, being, as they allege, received by them as drawbacks during the years 1868 and 1869, in excess of the drawbacks current at the time, and in a letter dated 1st of February, 1870, making this claim, it is distinctly stated that if the claim is not properly adjusted, 'this company will feel constrained to commence legal proceedings for its recovery, and will refuse to permit Messrs. AUDENRIED & Co. to occupy a wharf at Richmond hereafter.'

"The last threat has been carried into full effect, and the plaintiffs are entirely deprived of all wharf accommodations at Richmond. It will be observed that the defendants, as carriers of coal, take charge of it from the coal region until it is loaded into the vessels at Richnond. The railroad is thus extended from its commencement in Schuylkill county until it reaches the vessels in the Delaware, into which the coal is to be loaded. Of the contracts for 1868, we have no other evidence than that the drawbacks were given by the President and Mr. TUCKER, and paid and settled without a word of complaint on either side. In the beginning of 1869 it was deemed important, as had been found in 1868, to induce large shipments of coal to the eastward, and particularly to Boston, which could only be done by giving heavy drawbacks, so as to enable the shippers to sell at prices which would enable them to compete with the coal of other companies, whose natural terminus was New York, and not Philadelphia. An effort was made by Mr. SMITH, in March, 1869, to have the trade called together, and to induce them to sell coal freely, and to unite with the company at low charges for transportation, in exhibiting the strength of the Schuylkill region. Colonel DAY, the gentleman spoken to, said to Mr. SMITH, 'That it was *our* fight with the New York companies, and that we ought not to urge the operators to participate in it,' at which he said Mr. SMITH exhibited a good deal of annoyance.

"Mr. TUCKER says, in his letter of 6th December, 1869, to Mr. SMITH, which was read to the President before it was sent: 'I inquired if he [Col. DAY] recollected how low you [Mr. SMITH] offered to transport the coal. He replied that he thought you said as low as fifty cents, if it was necessary to maintain a successful competition. I then asked the committee how they supposed we felt when AUDENRIED & Co. proposed to secure to us the transportation of one hundred thousand tons at the price agreed upon. I stated that we felt under great obligations to them.'

"Mr. JOHN TUCKER, a very able and acute man of business, in the conclusion of his letter says: 'Even now, with all the money we have made, I would be better satisfied if we all had had a steady and regular business, and working to our capacity at the charges on AUDENRIED's coal than I am now. The battle should have been fought, and we should have won it. Now, a conflict is probably before us."

"It is clear that whatever contract was made between Mr. TUCKER, the recognized agent of the Philadelphia and Reading Railroad Company, and Mr. ADDISON CHILD, on behalf of the plaintiffs, at which W. G. AUDENRIED was present, 'it was all verbal, except the memorandum mentioned in the bill.'

"Of this contract there are three competent witnesses, Mr. TUCKER, Mr. CHILD, and Mr. AUDENRIED; and by it, whatever it was, both parties in good faith should be bound. The error, if there be any, has been in turning to resolutions of the board, and assuming that all contracts made by authorized agents were illegal, if not in strict conformity with them. There is no evidence that the drawbacks of 1868 were not regularly allowed by the proper authority, and paid in regular course by the proper officers. In ordinary cases this should settle this part of the claim. The drawbacks of 1869 were the fruits of a special contract, as stated by the agents of the two parties. Some of the details may be disputed; but it is certain that they were all paid in due course after the attention of the incoming president had been called to them. Under this state of things, it is clear that these matters were the subject—first, of amicable settlement, and if that could not be effected, by, second, an appeal to a legal tribunal; but not of duress *per minas*, of breaking up an old-established customer by depriving him of all wharf accommodations at Richmond. I think the reason assigned did not justify the defendants in taking away from the plaintiffs all proper wharf accommodation.

"As there was no reason justifying the Company in their action, is the assignment of wharf accommodation to persons situated as the plaintiffs were and are, a mere matter of caprice? This is a question of the gravest character to the Company, who derive all their chartered rights from the State, and to the community at large, who cannot look on without a strong feeling of disapprobation at the arbitrary acts of a corporation, however wealthy and powerful.

"I am of opinion the defendants were and are bound to give the plaintiffs proper wharf accommodation at Richmond, and I accordingly grant an injunction as prayed for in the second, third, and fourth paragraphs of the prayer.

"The decree in proper form to be entered forthwith.

"The following decree was accordingly entered:

"AUDENRIED, ET AL., v. THE PHILADELPHIA AND READING RAILROAD COMPANY.—*In the Supreme Court; In Equity; January Term*, 1870; *No*, 60. —And now, April 29, 1870, this cause having been heard on the bill, affidavits and depositions taken on the part of the plaintiffs, and the depositions taken on the part of the defendants, and the same having been argued by counsel, and the Court having taken time to consider the same, it is ordered that an injunction do issue, as prayed in the second, third and fourth clauses of the prayers of the bill filed in this cause, enjoining and restraining the defendants as therein prayed, until the further order of this Court, upon the plaintiffs giving bond with security in the sum of ten thousand dollars, conditioned as required by the Act of Assembly in such case made and provided, to be approved by the Prothonotary. Per curiam."

The Discovery of Springs.

By JULIEN THOULET, M. E., Wilkesbarre, Pa.

II.

THE springs follow, therefore, as we have already said, the invisible valley (synclinal) formed by the disposition of the rocky strata in the interior of the ground; but this valley seldom corresponds with the visible depressions of the surface, which are modified every day by numerous causes. Among these we may mention, as the most prominent, the alluvial deposits produced by heavy rains and freshets. It is clear, therefore, that sometimes the springs are very near the surface, and sometimes they lie very deep. As they are, moreover, either plentiful or weak, the hydroscopist will have to look for the solution of the two following questions:

At which part of their course can springs be reached at the least depth?

Which are the points where they offer the greatest amount of water?

A spring can be reached at the least depth:

I. In the centre of the first fold of ground, where all the small streams of water meet which form its beginning, because it is there that the layers of detritic soil, resulting from the erosion of the surrounding hills, have the least thickness, by reason of the greater facility with which, at this point, the accumulated soil is washed away by surface torrents.

II. At the foot of every slope of the visible valley. In digging at any point upon a hill side, the depth to be penetrated is less than it would be at the summit, by the difference of topographical level between the summit and the point of excavation. This is so generally the fact, that even the springs which emerge naturally into the light of day do so for the most part at the lower or lowest parts of superficial slopes. The only exception to this general law is presented by the case in which there is above the point where the excavation or boring is made, a stratum of impermeable rock, cutting off the water-bearing layers. In this case the water is dammed away, as it were, from its natural course; but in consequence of this obstruction, it is forced to find some other outlet, and commonly appears upon the surface, thus relieving man from the necessity of explorations to find it.

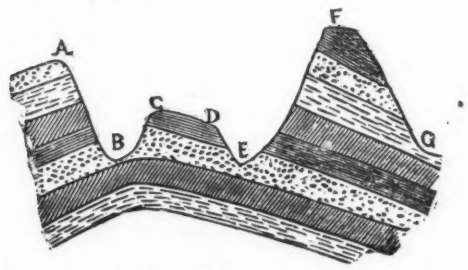
III. In the neighborhood of its appearance, since a spring can never be below the level of the apparent current of water into which it flows. When the centre of a valley is uncultivated, valuable information may be derived from the presence in certain places of willows, poplars, reeds, and other plants generally growing near water. Too great importance must, however, not be attached to this sign, because those plants may also grow on an argillaceous soil, retaining moisture for a long time, in which no subterranean current of water may exist.

Springs have the greatest amount of water at the foot of the slopes, because the features of the surface are generally caused by beds of rock or of hard soil, which support the upper portion of earth, and are generally crossed by the water in only one channel. After leaving the slope, the spring enters ground less inclined, and encumbered by alluvial soil; here it is divided into more or less numerous streams, as there is only very little resistance offered to its movement; and it may even take the form of a thin, but very broad sheet. This case is presented by plains receiving much water from the neighboring valleys, and composed, to a certain depth of gravel or sand, under which an impermeable bed, parallel to the surface, exists. In such localities, when the water has once been met with at a certain depth, it may with entire certainty be expected to be found at the same level in other portions of the plain: and frequently it happens that even several sheets of water are found in superposition, the deeper ones being more plentiful, as proved by the boring of artesian wells.

As springs originate from rain water, and are fed from above, instead of below by means of inverted syphons, as was once supposed, they can never be on the very summit of a mountain, and it is consequently useless to look for them in such places.

Plateaus cannot contain any useful springs, unless they are at least from 1,500 to 2,000 feet broad, and possess favorable ground; the extreme limit may be fixed for conical and isolated mountains at from 1,200 to 1,500 feet diameter, and the same will be true for prolonged hills, especially if their stratification is divided according to their axis—or, in other terms, if their top

is an anticlinal line. Thus we see the importance of geological knowledge for persons occupying themselves with the discovery of springs; it is entirely a question of the internal constitution of the ground and the disposition of its strata; a good geological map is, therefore, the most important auxiliary that can be employed.

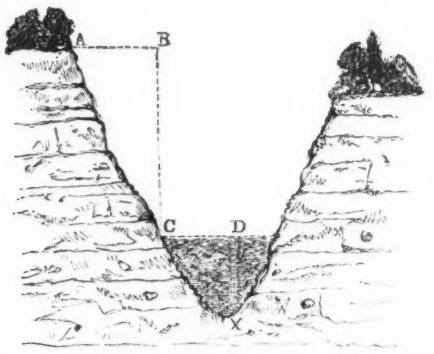


Let us suppose the above figure to represent the section of a certain ground and the dip of its strata. It is evident that from A to B, from B to C, and from E to F, we will find no spring; and if by chance we meet some small streams of water, they proceed from filtration through a very thin bed of superficial vegetable soil, are scanty, and consequently useless, because the whole water falling upon the surface represented follows the direction of the strata, and will be of advantage only if we take it on the left of A, from C to D, from D to E, and especially in the direction of F to G.

As a consequence, we conclude that, if the slope of a hill is completely smooth and without depression, we have to go on this slope as far as possible from the crest of division or on the side with which the strata dip, and if we cannot get water in any other way, we must make a horizontal ditch, of a length proportional to the quantity of water wanted. If the hill is cut from the top towards its foot by depressions, we must establish the prospecting works in the middle line of one of them, or more particularly on the line of intersection between the hill and the plain; by digging towards a projecting angle, on the contrary, we would find no water at all.

A very good way to attain a skill seeming wonderful to those persons who ignore the principles upon which we have to rely for the discovery of springs, is to examine carefully a great many springs coming naturally out of the ground, to study the direction they follow, the quantity of water they produce, and the strata directing them. The student will thus find that the course of the springs, though depending on the general laws above expressed, changes in every kind of ground; in the primordial rocks, the springs are generally very numerous, not very deep, rarely disturbed in their direction, and carrying a small amount of water; in the secondary rocks, they are less numerous, lie deeper, and carry more water, and their course is rather disturbed. By noting all this, the student will be persuaded that, in order to dig with success, it is necessary to imitate nature, and to arrange his works in a manner most similar to the condition where the springs show themselves naturally.

We have now to study the way to estimate the depth of a spring below the surface of the ground. Generally, the line of intersection of the two hills forming the sides of the valley is the channel of the spring; consequently, if we intend to dig in the centre of a valley, in case the spring appears naturally in several places, the depth of the water between two of these points will be equal to their difference of level, less the fall of the spring. If the spring does not appear naturally, we have to rely on levelling and a similitude of triangles—work which some practice will permit to execute without any instrument, by an approximate observation of the eye and a short mental calculation.



Let us suppose that the bottom of a valley is occupied by alluvial soil, below which runs the spring; the depth, D, X, is to be found. For this purpose we will fix the point D by the means above mentioned; then, having the height, C, B, of the hill, measuring C, D, the length of which is the distance between the digging and the foot of the hill, and supposing the side A, C, X, to be in straight line, which can be done without making an appreciable mistake, we have the following proportion from the similitude of the triangle, A, B, C, - C, D, X;

$$\frac{BC}{DX} = \frac{AB}{CD} \text{ and } DX = \frac{BC \times CD}{AB}$$

Consequently, we have to multiply the length of B, C, with the length of C, D, and divide the product by the number representing the length of A, B. If we want to know the depth of a spring on a hill, we have only to observe the permeable and impermeable strata, and knowledge in regard to this we cannot obtain except by the study of geology.

In order to judge of the quantity of water in a spring correctly, a great number of previous observations are required, so as to be able to make intelligent estimates. Besides, the proportions of the volume vary always considerably: the season of the year, the quantity of rain, the permanence of these rains, the more or less recent time of their fall, are of the greatest importance. In France, where the science of hydroscopy has been the object of serious study, in order to discover convenient water for agricultural and industrial purposes, and the supply of steam engines and railroad locomotives, it has been ascertained, that in times of ordinary dryness, the surface of an isolated plateau of about twelve acres, covered from six to twenty-five deep with detritic soil, lying on an impermeable and favorably-inclined stratum, produces a spring of about two-fifths of an inch diameter, giving nearly seven pints of water every minute.

It is easily understood that this quantity must be variable in different localities, according to the nature of the soil; and the numbers above mentioned have almost no more importance than as a point of departure for personal observations.

Report of the Hon. John Jay Knox, Deputy Comptroller of the Currency,

UPON THE MINTS, ASSAY OFFICES, AND COINAGE OF THE UNITED STATES.

Continued from p. 296.

A BILL has recently passed the British Parliament, authorizing payment in coin to depositors of refined bullion, without any charge whatever for assay or coinage. The coinage charge at the French mint is about one-fifth of one per cent.; our present charge is one-half per cent. This it is now proposed to abolish, in order to conform to the English custom, and because it should be the policy of the government to hinder rather than to encourage the export of bullion. Our present laws have the effect to induce bankers to ship bullion as commodities, for the purpose of making sterling exchange.

A very intelligent gentleman upon the Pacific coast, who is thoroughly familiar with this question, in a recent publication thus refers to the subject:

"I do not desire to be understood as arguing that any change of our mint laws will put a stop to the export of the precious metals, when it becomes necessary for the adjustment of the balance of trade. That is one of those inexorable commercial necessities so well understood that it would be folly to pretend to the discovery of any expedient that would obviate it. My proposition simply is, that when the balance of trade is not against us, the precious metals are exported as commodities for the profit on their out-turn, above the par exchange, or may be so exported in excess of what the balance of trade requires. In other words, when the market is abundantly supplied with commercial bills with which bankers could cover their own exchange, they still prefer to ship bullion, not only as being a safer remittance, but as also furnishing a profit on the out-turn, equal to, or perhaps exceeding the discount on commercial bills. Furthermore, that while the balance may be against us in the aggregate, yet, with reference to the particular periods of time, and to particular countries, it may be in our favor, and that a nation may become an importer of the precious metals as commodities, without reference to the balance of trade. Such, indeed, is our daily experience here. While we were exporting our unrefined gold and silver to Europe, and our refined metals to China, we are importing gold from British Columbia and silver from Mexico.

"While in the last ten years we have exported about $612,000,000 of our native product, we have imported $157,000,000 of foreign treasure, and yet we receive no practical benefit from it as a means of increasing our metallic circulation, for it no sooner reaches our market than it commands a premium above its value in our mint for re-export, when it is in the form of bullion; and when in coins it only entails a loss upon American commerce, as they are received abroad at a greater valuation than they will realize either in our market or at our mints, and we are, therefore, in every event, and under every condition of trade, the loser. As the commercial value of gold, as a commodity, is greater than its value in our mints, our own production seeks other markets uncoined, and that of other nations avoids ours. While, however, there is a profit in the export of uncoined bullion taken at its valuation in our mints, there is always a loss on the export of our coins taken at their current value. The result, therefore, of modifying our mint charges, so as to conform to those of other nations, would be to raise the coining value of gold at home above its commercial value, and thereby make it more valuable for coinage than for export. It would, therefore, all seek our mints for coinage, and, when once coined, would be the very last thing any one would want to ship, and never would be exported, except in cases of absolute necessity, and when no other medium of exchange could be procured."

"My attention was attracted to the very small amount of refining and coinage executed at the branch mint at San Francisco, as compared with the production of the country, and I was naturally led to inquire for an explanation. A due examination of the subject soon satisfied me as to the cause, which I found to be that, under our present system of mint laws, bullion has a higher commercial value for export than for coinage in the mint, which not only affects the local interests of that coast, but, in view of the diminishing product of the precious metals, becomes a question of national importance. The reason for this is that, as gold and silver are chiefly valuable for the purpose of manufacturing money, the cost incidental to coinage necessarily determines the value of the bullion. I find on comparison, and especially at San Francisco, that the expenses of coinage are much greater than abroad, and hence our metallic product commands a higher price in foreign countries than can be realized by its coinage at home. The principal charge tending to produce this result is that of the half of one per cent. for coinage, which is above that of any other nation, and especially France and England, where most of our gold bullion is exported.

"The importance of this subject had presented itself in a measure to me, while I was a director of the mint, and in my annual report for 1868 I recommended its reduction from a half to a quarter of one per cent.; but my examination at San Francisco has led me to consider the subject more thoroughly, and I am convinced that it should be abrogated altogether, and that we should return to our uniform practice prior to 1853, which was to coin gold without charge, not only as an expedient for encouraging coinage, but as being more consistent with the theory of money as a universal standard of value.

Hon. H. R. LINDERMAN, late Director of the Mint, in his recent report to the Department upon the Branch Mint at San Francisco, confirms this statement.

"A few examples will demonstrate the fact that bullion is, as I have before stated, of greater commercial value in our markets for export than for coinage at the mint. An unparted stamped bar (ounces, 42,240 gross, 892-thousandths fine of gold, 98 fine of silver, and 10 parts base metal) deposited at the Branch Mint, San Francisco:

Value of gold		$778 87
Value of silver		4 85
Premium on silver, 4 per cent.		19
Branch Mint, gross value		$783 91
DEDUCTIONS.		
Refining charge, 11 cents per ounce, gross	$4 65	
Coinage charge, one-half of one per cent.	3 91	8 56
Net Branch Mint return		$775 35
Same bar sold in market as bullion, stamped, ounces 42,240, 892 fine (sold at par, 892)	$778,87	
Loss, one-eighth of one per cent., assay charge	97	777 90
Difference in favor of sale in market		$2 55
The same bar, if minted at New York or Philadelphia:		
Gross value of bar		$783 91
DEDUCTIONS.		
Refining, 5 cents per ounce	$2 11	
Coinage charge, same as at San Francisco	3 91	6 02
Net United States Mint or United States Assay Office return		$777 89
The same bar, if sold at New York at one-eighth on 900, would net		780 81
Difference against deposit for coinage, and in favor of sale as bullion for export		$2 92
The same bar deposited at San Francisco assaying works:		
Gross value		$783 91
DEDUCTIONS.		
Refining, 8 cents per ounce, gross	$3 31	
Coinage charge	3 91	7 29
		$776 62
Sold as bullion for export		777 90
Difference against deposit for coinage		$1 08

The net proceeds of the same bar, if coined without deduction of the half of one per cent. for coinage, would be as follows:

		Market value as bullion.	Difference in favor of coinage.
San Francisco Branch Mint	$779 26	$777 90	$1 36
Philadelphia Mint and New York Assay Office	780 80	781 81	99
San Francisco refining works	780 53	777 90	2 63

The proposed bill authorizes the issue, as at present, of the three and five cent nickel coins, and in addition a one-cent piece of the same material. These coins are made redeemable in lawful money in sums of fifty dollars, and are a legal tender in sums of twenty cents in any one payment. The proposed cent coin will be one and one-half grains in weight, a little heavier and a little larger than the present five cent silver piece, which, together with the three cent piece, is discontinued. The copper and bronze coins, heretofore authorized, are exchangeable for the copper-nickel coins. They will, therefore, gradually pass out of circulation, leaving eventually a minor coinage of one material and of uniform value. A suggestion was made to authorize the issue of but a single coin in addition to the gold and silver coinage now in existence, that piece to be of one cent, into which all other token coins should be exchangeable; but the present copper-nickel coins are convenient and popular, and it was not thought best to withdraw them, but to provide for their redemption, and the discontinuance of the issue when redundant.

The present law authorizes an allowance to the melter and refiner of two ounces of wastage on every thousand ounces of bullion manipulated; to the coiner, one and one-half ounces on every thousand ounces of gold, and two ounces on every thousand ounces of silver manipulated. In the proposed bill the allowance is reduced nearly one-half, the melter and refiner being allowed one thousandth on gold and one and one-half thousandth on silver; and the coiner, one-half of one thousandth on gold, and one and one-half thousandth on silver. Experience in the mints and assay offices for some years past has shown that the present allowance is excessive, and that not one-fifth of the amount is required. The propriety of a reduction is therefore evident.

The law prescribes that the gold and silver coin shall be nine-tenths fine; that is to say nine parts pure gold or silver, and one part alloy. It is not practicable in the operations of the mint to conform exactly to the standard fineness, consequently a limit of variation, termed the "tolerance," is allowed under existing laws. This tolerance is two-thousandths on gold and three-thousandths on silver ingots prepared by the melter and refiner. In delivering ingots to the treasurer he is credited with the standard weight, even though they are two-thousandths below it in fineness. The actual practice of the mint is not to approve ingots varying more than a half of one-thousandth, or one-fourth of the legal allowance from standard. It has been thought best, after careful consideration, to reduce the tolerance of fineness to one-thousandth in gold and to one and one-half thousandth on silver.

It was also found impracticable to prepare coin of the precise weight prescribed by law, and a deviation therefrom is allowed. Under existing laws the deviation in the double eagle, eagle and half eagle, is one half grain* troy, or about two cents; in the quarter eagle, three dollar, and one dollar gold pieces, one quarter of a grain (on each). In the silver coin it is greater than in gold coin, as the former are not usually adjusted by hand, the deviation being one and one-half grains ($\frac{3}{2}$ of one cent) on the half dollar; one grain on the quarter dollar ($\frac{1}{4}$ of one cent), and one-half grain ($\frac{1}{8}$ of one cent) upon the dime. To prevent an issue of light coins below the prescribed weight within the limit of tolerance, the law prescribes that when a number of pieces are weighed together for delivery by the coiner to the treasurer, and by the latter to the depositor, the deviation shall not exceed three pennyweights (value $2.79), in one thousand double eagles; two pennyweights (value $1.86) in one thousand eagles, one and one-half pennyweights (value $1.39.5) in one thousand half eagles; and one pennyweight (value $0.93) in one thousand dollar pieces.

It has been deemed expedient to contract the allowance in weighing a number of pieces, as a more effectual check, and to protect the government and the public against the possibility

of uniformly using coins of light weight. The coiner is credited with the standard, whether coins are above or below the legal weight, provided they are within the limits of "tolerance." The bulk of our gold coinage is in double eagles, on which the allowance in the single piece is one-half grain; now, if the law did not provide for weighing a large number of pieces together, there would be nothing to prevent a delivery to the Treasury of large amounts of these pieces, each one of which might be three-eighths of a grain light. In delivering 1,000,000 ounces, or $20,000,000 in double eagles, the coiner would be credited with the standard weight, although the actual weight would be about 781 ounces, or $14,530 less than the amount required in weighing a number of pieces together. This allowance is unnecessarily large, and the limit has therefore been reduced, although still in excess of the actual results of the daily transactions of the mint.

In the proposed bill the deviation in weight allowed is as follows: In the double eagle, one-half grain troy; in the eagle, three-eighths of a grain; in the half-eagle, one-quarter of a grain; in the three dollar piece and quarter eagle, one-sixth of a grain; and in the dollar piece, one-twelfth of a grain; in the half and quarter dollar silver pieces, one grain, and in the dime, one-half grain. In weighing a large number of pieces together the deviation allowed in five thousand dollars' worth of double-eagles, eagles, half-eagles and quarter-eagles is one-hundredth of an ounce (about eighteen cents), and in three thousand dollars' worth of three dollar pieces it is 7½ one-thousandths of an ounce, and in one thousand dollars' worth of dollar pieces, five-thousandths of an ounce; in one thousand dollars' worth of silver half and quarter dollar pieces, two-hundredths of an ounce, and in one hundred dollars' worth of dimes, one-hundredth of an ounce; the "tolerance" of weight being in the proposed bill only about one-fourth the amount now authorized in gold, and one-third the amount in silver, taking into consideration the relative quantities of the several denominations now coined.

The act of February 21, 1853, provides that the silver coin less than one dollar "shall be paid out at the mint in exchange for gold coin, at par, in sums not less than one hundred dollars." It was evidently intended that these subsidiary coins should be issued only in exchange, at par, for gold coin. But the practice at the mint for many years has been to purchase all silver bullion offered, at about $1 22½ per ounce, which is above the market price, paying therefor in silver coin. The ounce of silver purchased is worth $1 25 in the silver coin issued, weight for weight; so that the government really reserves a seigniorage of two and a half cents per ounce. The effect of the mint practice has been to put in circulation silver coins without regard to the amount required for purposes of change—creating a discount upon silver coin, and bringing loss upon holders of any considerable amount. These coins are a legal tender for five dollars; but they are not received at the custom-house in payment of duties, except for fractional portions of a dollar. The coins thus issued have accumulated, and are now at a large discount in Canada and California, and will again become burdensome at home when brought into circulation.

The correct method of issuing silver coin is as was originally contemplated—to purchase with gold such an amount of silver bullion at market rates, as is needed for coinage into fractional parts of a dollar; to issue the silver coins only in exchange for gold at par, and to require the manufacture of such coinage to cease whenever there is evidence of a redundancy. In the proposed bill the language is clear and explicit on this point, and these silver coins are made a legal tender for sums less than one dollar.

The dollar unit, as money of account, was established by act of Congress, April 2, 1792, and the same act provided for the coinage of a silver dollar "of the value of a Spanish millard or pillar dollar, as the same is now current." The silver dollar was first coined in 1794, weighing 416 grains, of which 371¼ grains were pure silver, the fineness being 892.4-1000. The act of January 18, 1837, reduces the standard weight to 412½ grains, but increases the fineness to 900-1000, the quantity of fine silver remaining 371¼ grains as before, and at these rates it is still coined in limited amount.

The act of March 3, 1849, directs the coinage of gold dollars. They were issued the same year, weighing 25 8-10 grains, 9-10 fine, 23 22-100 grains being pure gold. By the act of April 2, 1792, 371¼ grains of pure silver and 24¾ grains of pure gold were declared to be equivalent one with the other, and to the dollar of account. At that time, as now, in Great Britain, 113 grains of pure gold were the equivalent of the pound sterling. The value of one pound in federal money, therefore, was $4,565. Prior to this date, and during the confederation, the dollar of account, as compared with sterling currency, had been rated ar 4s. 6d., which was an exaggerated valuation of the Spanish dollar; and, in precise accordance with this valuation, the Congress of the confederation had established $4.444 as the custom-house value of the pound sterling.

The effect of the act of 1792 was really to reduce the value of our dollar of account, but apparently to increase the value of the pound sterling about 2¾ per cent. By the act of June 28, 1834, the weight of fine gold to the dollar was reduced from 24.75 to 23 20-100 grains; and three years later, January 18, 1837, it was fixed at 23 22-100 grains, where it now remains. Comparing this latter weight with the pound sterling of 113 grains, we find an apparent increase in the value of £1 to $4.866, an advance of exactly 9½ per cent. upon the old valuation of $4.444. We have here the explanation of the existing practice in this country of quoting sterling exchange at 9½ per cent. premium when it is really at par; assuming the value of gold to be fifteen and one-half times that of silver, being about the mean rate for the past six years.

The coinage of the silver dollar piece, the history of which is here given, is discontinued in the proposed bill. It is by law the dollar unit, and† is worth in gold a premium of about three per cent., ($1 03 12-100) and intrinsically more than seven per cent. premium ($1 07 72-100) on our other silver coin. The present law can be so construed as to authorize both a gold dollar unit and a silver dollar unit, one differing from the other in intrinsic value. The present gold dollar piece is now the dollar unit in the proposed bill, and the silver dollar piece is discontinued. If, however, such a coin is authorized, it should be issued only as a commercial dollar, not as a standard unit of account, and of the exact value of the Mexican dollar,‡ which is the favorite for circulation in China and Japan.

In the proposed bill the weight and fineness of the gold and silver coins remain unchanged; but as the *gram* is now a legal unit of weight, (Act July 28, 1866) the weight of the different coins in the schedule annexed has been given in grams, as well as in grains troy. The propriety of substituting the metric system authorized by law for the present unit system of ounces and decimals for weighing bullion, of pennyweights and grains in weighing and adjusting coin, and of grams and milligrams in the process of assaying at the mint, has been suggested. This can be done with little inconvenience, and is recommended.

Should the metric system of weights be adopted, as suggested, exclusively for use in the mint, the following deviation it metric weight may be substituted for those in troy weight, above given. In weighing single pieces, for each double eagle, thirty-three and a third milligrams; for the eagle, twenty-five milligrams; for the half eagle, fifteen milligrams; for the three-dollar piece, twelve milligrams, and for the quarter eagle, ten milligrams; for the dollar piece, five milligrams; for the silver half and quarter dollar pieces, sixty-two half milligrams, and for the dime, fifty milligrams.

In weighing pieces in bulk, the following metric deviation may be substituted: in deliveries of five thousand dollars' worth of double eagles, eagles, half and quarter eagles, three hundred milligrams (about eighteen cents); in deliveries of three thousand dollars' worth of three dollar pieces, one hundred and eighty milligrams; and of one thousand dollar pieces, sixty milligrams; in deliveries of one thousand dollars' worth of half and quarter dollar pieces, 625 milligrams; and of one hundred dollars worth of dimes, 625 milligrams.

Our silver coinage, by an increase of about one-half per cent. in weight, would be rendered metric, so that two dimes would weigh five grams, thereby being equal in weight to the nickel five cent piece; and ten of these dimes would be the exact equivalent in weight and fineness to the standard legal-tender silver five-franc piece of France, which is of the value of $0 96 18-100. The difference of value between the gold and silver coins would still be sufficient to prevent the exportation of the latter, judging from their relative value for the past sixty years, and if any change is to be made in the weight of the silver coins, this is suggested.

The United States would undoubtedly agree to any system of international coinage having simple relations to some acknowledged unit of weight first agreed upon by England and France, in order to simplify the present absurd system of calculating exchange; but if it is proposed to lead the way in such a system, then the metric system presents advantages over any other proposed. It is probable that the larger portion of our gold coins (to-day) in circulation would, if weighed together, fall short of their original weight, arising chiefly from abrasion, more than three dollars on the thousand dollars, which is the difference between the metric coin proposed and the existing coins; so that, if the coinage of the country were to be exchanged, weight for weight, for metric coins, there would probably be very little difference.§

In the preparation of the bill, I have been greatly indebted to ROBERT PATTERSON, FRANKLIN PEALE, and J. ROSS SNOWDEN, of Philadelphia; L. A. GARNETT and JOHN HOUSTON, Jr., of San Francisco; E. B. ELLIOTT, of the Treasury Department, and to the officers of the different mints and assay offices, for notes and suggestions, and particularly to Hon. H. R. LINDERMAN, late director of the Mint, who has been associated with me, by your direction, in the final revision as now presented.

Since the year 1837, no revision of the various Mint laws has been attempted, and the necessity and importance of such a work has long been experienced. The proposed bill has been prepared with great care, and if it shall receive the indorsement of Congress, and become a law, it is confidently believed that it will add much to the efficient and economical administration of this very important branch of the government service.

A schedule of the weight and fineness of all the coins of the United States, both in troy and metric weight, is appended; also, one giving the tolerance now authorized, and the tolerance herein proposed.

A schedule is also inclosed, exhibiting the wastage annually at the Mint at Philadelphia, from 1857 to 1869.

A copy of the "Coinage Act, 1870," which has recently passed the English Parliament, is also given.

Respectfully submitted, JOHN JAY KNOX,
Deputy Comptroller of the Currency.

Hon. GEORGE S. BOUTWELL, Secretary of the Treasury.

---

* A grain of gold, standard, is worth nearly four cents (0.3876), and a grain of silver one-fourth of a cent (0.25).

† New American Cyclopedia.

‡ Assuming the value of gold to be fifteen and one-half times that of silver, the French five franc piece is worth about ninety-six and one-half cents (96.4784), the standard Mexican dollar $1.0490 100, our silver dollar piece $1 03 12-100, and two of our half-dollar pieces 96 cents.

§ From the commencement of the seventeenth century the value of gold in comparison with silver gradually advanced, reaching in the middle of that century, fourteen and one-half times that of silver. During the twenty years previous to 1809, gold averaged 149, nearly fifteen times the value of silver. During the thirty years previous to 1849, just previous to the discovery of the new gold fields, it averaged nearly fifteen and seven-eighths (15.82) times that of silver; in 1859 its relative value was 15.2, since which time it has advanced to 15.6, the point it now holds.—Report of Special Commissioner of Revenue, 1869 (Elliot's tables), page 141.

Polytechnic Club of the American Institute.

Meeting held at the Rooms of the Association, May 11, 1870, Professor S. D. TILLMAN in the Chair.

MR. WING presented and explained an improvement in his shampooing apparatus, which relieves the shoulders from the weight.

MR. DARBY then took the floor, to present a supplement to his former paper upon malaria. In this city, no less than 7,454 persons died during last year from zymotic diseases, and of these, some 3,870 died in the summer quarter. If, during the whole year, they had died at the same rate, the number would be some 15,000 and upwards; so that we find that the cold weather produces a saving of some 8,000 lives, which we should otherwise expect to lose from diseases of this character. He thought this was a hint, and that, by acting upon it, the 7,000 lives might be saved.

The various theories of the animal or chemical origin of diseases, the researches of the microscopists, and other kindred questions, were then discussed at some length. In speaking of the evils of poor ventilation, it was impressed upon those present that the danger is from the emanations of the human system rather than the carbonic acid in the air. It was remarked that vegetation is the great protection against malaria. The speaker decidedly opposed the trimming-up of the trees about a house, as they absorbed or destroyed the malaria. He thought there should never be a vacant spot, for only the metamorphic rocks were safe when not covered with vegetation. Typhoid fever on plantations at the South illustrated this fact. It is prone to appear where the ground is denuded of vegetation and was not covered by water. The fever appears on the plantations after the crops have been gathered. The speaker had recommended Southern people to move their cabins into the woods, where the vegetation would protect them. In 1856, he discovered, near Altoona, Ga., a strange plant, which Dr. GRAY pronounced on inspection to be a native of Japan. How it came to this country was a curious question. In the course of three years it spread over a region two hundred miles wide, and as it grows till after frost comes, it is a protection against malaria. The speaker pronounced ozone to be an antidote to this poison, and claimed that the facts he had observed confirm the chemical rather than the parasite or germ theory of the origin of zymotic diseases.

The next regular subject for the evening, "The Different Modes of Testing the Power of Steam Engines," was then taken up by Dr. VAN DER WEYDE. Animals, he said, had been compared to steam engines; but the comparison would hardly hold good. They were far more economical than the best engine—more compact; a better machine, in fact. In a steam engine, people were not likely to look upon the first cost, nor upon the attendance it was likely to require; and they were perfectly right in this. It is not probable that the latter can be decreased, and the former is subordinate to many other points.

The main points upon which economy depends were then stated. The chief of these are the engine and the boiler. These are two very different things, and can be judged separately. The scale for this judgment is the foot-pound. In the first days of the steam engine, it was found that the actual and theoretical power of an engine were widely different. The difference was enormous; and for want of a better reason, was set down against "frictions," till at last it was suggested that the steam was reduced in pressure before the receding piston, and this variable pressure must be made the basis of the calculation. In order to do this, the indicator must be used. The cut-off was an attempt to economize steam by using all its elasticity.

The President then remarked that the indicator was an invention of a young man employed in JAMES WATT'S office, and that WATT saw its advantages, and claimed the invention as his own. These facts are well substantiated. WATT had made the differences between the nominal and actual horse-power a study, and was very quick to see the advantages of the invention.

The results obtained from the indicator may be proved by the dynamometer, which measures the exact force with which the engine turns a shaft or drives a wheel. Their results correspond; for the indicator shows less steam used when the engine is running light then when working up to its full power.

Another way of estimating the amount of work performed is by measuring the steam consumed. Experiments in this line had been performed at the Brooklyn Navy Yard, in pumping at the dry-dock, where every facility for doing it existed. The steam was measured, and the amount of work done by it in pumping accurately known; and it was found that the engines were much more economical than the boilers. It is best in estimating power to separate the engine and boiler. The best way to do this is to measure the amount of heat consumed in the engine and the amount wasted in the water of condensation. This gives us the best of all methods of getting at the exact amount of work performed be the engine. The rule is to multiply the number of pounds of water by the number of degrees to which it is heated in the act of condensation, and that gives the number of units of heat lost by the engine. For example, if the number of units of heat thus found is 24,000, and the horse-power is 60, then the loss per horse-power is 400, and it is a curious fact that this loss per horse-power is constant in each engine, no matter what amount of power is being developed at the time. By the use of the self-registering thermometer, the exact loss and work of the engine may be ascertained for the whole day, or at any given time in the day.

The time having expired, the Club was declared adjourned until Thursday, 19th inst., when this subject will be resumed.

MINING SUMMARY.

The Prospects of Mining in the Great North-Western Regions in 1870.

For the past two years, says the Portland *Oregonian*, the mines throughout all the northern interior—regions which usually give tribute to this city or State—were unproductive, by reason of the light falls of snow and the consequent scarcity of water in the spring and summer months. Nearly all the mines of Eastern Oregon, portions of Idaho, Washington, and British Columbia, which a few years ago sent hundreds of thousands of dust and bullion to and through Portland, are dependent altogether upon the supply of snow for the water to be used in working their mining grounds. Many of the mining camps are rich in dust, but their wealth cannot be turned to account without water; and so, for two or three years, the miners have been upon an average, barely paid for the time and expense of holding their claims. This unproductiveness of the mines has been seriously felt in all branches of business, not only in this city but throughout the State. It not only failed to give us our accustomed supply of money, but it operated to destroy a large market for our products. All these mines had been, prior to 1868, large buyers of certain articles of produce and provisions and of clothing, domestic as well as imported manufacture. Two dry seasons had the effect to nearly depopulate many of the very best mining districts, and with the migration of the mines, went an extensive and profitable trade. Last year our shipments to the mines were too inconsiderable for mention.

The outlook for 1870, is, however, we are happy to say, of the most encouraging character. We have accounts from all points in the interior, of unusually heavy snow falls throughout the winter, and so late as the middle of March of a fall of unprecedented depth and moisture, which extended not only all over Eastern Oregon but throughout all the adjoining Territories. To make this occurrence still more encouraging, this late snow is melting but slowly away, without rain, so that there is now almost a certainty that the mines will be amply fed with water till mid-summer—later than in any year since the discovery of gold at the north. Thus we are assured of an unwonted development of dust in all the mines. To add to the promise of a good yield, from the old mines we have the news of numerous discoveries of rich placer districts, and not a few gold and silver-bearing quartz lodes.

The Boise *Statesman*, of March 22nd, says of the Willow creek mines: "Mr. Anthony Moore brings very flattering news from the Willow creek mines. Prospects have recently been struck on a slate bed-rock superior to anything before found, and the show for water is excellent, as compared with former years. The snow is very deep on the mountains, and Chinamen are employed in rushing the ditch forward towards Burnt river. A good flow of natural water is assured, and the early completion of the ditch is confidently relied on to make the Willow creek country second to none of the mining districts extant. The country is extensive, and with a reasonable supply of water, will pay almost anywhere."

Rich discoveries have been made in Baker and Union counties, Oregon, within the last few weeks; there are several new and paying camps along Snake river, both below and above the Shoshone Falls. There is late news of one company about four miles above who are making good wages with rockers; and another company below who, with rockers, are making an ounce per day to the hand. Another company is reported who are making $40 per day.

A discovery of rich gold-bearing quartz veins in the Yakima country, has been reported within the last few days. We are, however, without reliable particulars.

A correspondent of the *Oregonian*, writing from Amelia City, Baker county, March 9th, says: "Considerable excitement prevails in this district at present. New discoveries are constantly being made. I have recorded one hundred and twenty mining claims within the past ten days, and about seventy-five more are now on file for record. From the present appearance of the elements, water will start through G. Kellogg & Co.'s ditch in a few days. There is a sufficient quantity of snow on the mountains to supply this camp with water for four or five months. Business of all kinds is quite lively."

A miner just returned to La Grande from El Dorado camp informs the *Democrat* that all prospecting done this spring, has been attended with encouraging results, and it is the general impression that there will be more gold taken out this season than the three seasons heretofore combined yielded. The miners have their sluice boxes and hydraulics all ready and are awaiting the coming of water to commence work. Travel is going into the camp quite lively.

A Mr. Kelly has struck very rich diggings on Burnt river. He gets not less than a dollar to the pan of dirt, and often obtains three or four dollars to the pan. Messrs. Carter & Walters, of Eagle creek, have found a quartz ledge lately, six pounds of rock from which, pounded in a mortar, yielded $52.

The Idaho papers report the recent discovery of a good mining camp near the head of Brunean river, where extensive preparations are being made for work as soon as the season will permit.

The Peace river mines of British Columbia are attracting great attention; and as early as the 1st of March a considerable number of miners had arrived at Victoria *en route* to that district. The emigration of these and other northern mines has had a marked effect upon business at Victoria, and should the diggings prove as rich as reported, we shall find our produce market in that direction greatly enlarged before the close of the season.

A letter from Cedar creek, Feb. 1st, says: "All the indications at the present time give promise of a rich camp, but it cannot be determined before June, owing to the almost inaccessible character of portions of the country. It had been raining for eight days, but the snow remained from two to three feet deep in Oregon gulch. Thirty-five buildings complete and some seventy-five or eighty in course of construction, comprise the town."

A private letter from South Pass City, Wyoming Territory, Feb. 22d, says that the Cariso mine near that place, which is in the Sweetwater mining district, has yielded 405 ounces of gold, of the value of $9,000, from 7½ tons of quartz—the result of six days' working with a six-stamp mill. A stampede to this district is anticipated.

These are really but a few specimens of the advices received from the great northwest mining regions, but they are sufficient to show how much more hopeful in the mining outlook for 1870, than have been the practical results of the last two or three years. It is hardly necessary to enlarge upon the benefits we must derive from a season of successful operations, such as we may reasonably expect with confidence for this year.

WHERE AND WHAT THE BIG HORN IS.

The following, condensed by the Salt Lake *Telegraph*, of April 28, from the special correspondence of the Chicago *Journal*, will be found interesting, not only as giving a history of the causes which produced the present excitement, but because there are not wanting people in the east who predict for the expedition a tragic termination: "By turning to the Fremont map the reader will see that one of the outlying spurs of the Rocky mountains, between latitude 43° and 45°, and on longitude 108°, is named the Big Horn range—so named by the early explorers of that country, from the fact that near where old Fort Smith now stands was one of those singular pyramids erected out of elk horns—a pyramid with a base of twenty yards square and an altitude of over sixty feet. The Big Horn mountains are drained principally by the Yellowstone, and are reported to be the sharpest and most abrupt of all the eastern range of the Rocky mountains. Wind river on the west, and Bad Water creek on the south, divide the range from the Black hills and the Wind river mountains. The climate of the range is a shade colder than that of Chicago, but being much more equable, is less sharp. As early as 1849 a party of Hudson's Bay men went from Winnipeg to Fort Benton, and thence made their way through territory occupied by the Cheyennes, Arapahoes and other Indians to the old Spanish fort of Galistro, south of Santa Fé. They reported they had passed through a country six days' march from Benton wonderfully rich in gold, some of which was carried away by the party, but the Indians forming the escort threatened hostilities if more was taken, and affirmed that no white man should ever take up his residence in or successfully work that region. In 1863, Red Cloud, with a party of warriors, followed a band of Shoshones, who had stolen some Sioux horses, to Fort Bridger. The officer at the fort received and entertained the Sioux chief, and gleaned from him, while he was under the influence of liquor, that there was more gold in the Big Horn mountains than in all Montana. Application was made to the War Department for a force of men to explore that region, one of the officers offering to furnish enough gold as a result to carry on the war against the South, but the application was not entertained. In 1868, a party of thirty men left Fort Benton to prospect the Big Horn country. At the expiration of two months one man—the sole survivor—returned; the others had been killed by the Sioux. This man declared that within twenty miles of Fort Smith there was gulch gold enough to pay the national debt; and he believed, from the geological formation and the surface indications, that the country was one vast deposit of gold. In March, 1869, an attempt was made by Capt. Laycock, Col. Luke Murrin, leader of the present proposed expedition, Dr. Latham and others, to get up a company sufficiently large to attempt the exploration; but the Sioux were on the war-path in force, and it was found impossible to get together a company strong enough to make the attempt. Such is, in substance, the statement of the *Journal's* correspondent of the ground-work for the present expedition, and the character of the previous efforts to explore the region referred to. That there is a vast amount of exaggeration in the reported wealth of gold there, every one who is acquainted with the way in which such things are colored, will at once admit. But that there is faith in the country being rich in gold deposits is also certain; and attempt after attempt will be made, should the present not succeed, either to make the expected discoveries or find them the wild imaginings of fervid fancies. Any way, they tell of war with the Indians, for it may be taken as a certainty that the Sioux will not yield up so extensive a hunting ground without a serious struggle."

Arizona.

MINING MATTERS—INDIAN MOVEMENTS.

From the Prescott (A. T.) *Miner* of April 9th, we cull the following: "Our mills are getting along swimmingly. Three mills are now running in this vicinity, besides several arastras. The last clean-up made at the Big Bug mill yielded $4,300. This amount was taken out in about five days. Taylor & Co., who have been working Charter Oak ore, in a new arastra, near the head of the Hassayampa, cleaned up recently, and got $57 to the ton. The gold taken out by them—a large cake—can be seen at Jackson & Bro.'s. A small bar—taken out at the Eureka mill—can be seen at the same place. The Eureka is now running on good ore, from the Pine mountain lode, and it is thought that the first clean-up will be a big one. The Sterling is pounding away. A clean-up has not yet been made. Excitement runs high about the new lodes recently discovered near Camp Date creek. Several citizens of Prescott and vicinity started for that locality this week. Arastras are being built, and a town will soon be laid off. Fred Henry has found the 'richest thing yet,' in Walnut Grove district. It is a ledge of gold-bearing rock that prospects 'vicinsly' for over three hundred yards. We saw a lot of ore at Jackson & Bro.'s on Wednesday last, and must confess that it displayed more free gold than any rock seen by us in many a day. C. Y. Shelton, of Walker district, has just finished working eight tons of Mountain Jay ore, from which he got about $36 per ton. The Vulture mill, near Wickenburg, is doing remarkably well. The news from the placers continues good. Some three weeks ago a party of nine prospectors left Prescott for a tour through the mountains, and in their rambles were discovered by the Apaches, who, one night, while the party was encamped near Bradshaw mountain, stole softly down and drove off two horses, a mule and burro belonging to the party. Shortly after the night of the robbery, the simple prospectors saw, while footing along a divide, a party of eleven savages sitting down quietly in a circle at the bottom of a ravine. While the foolish nine were discussing what to do, and how to act, the Indians discovered them and retreated as speedily as possible. Captain Preston, of Gen. Ord's staff, arrived at Fort Whipple recently, from Southern Arizona, and from him we learn that a site for a new post, to be built near the Sierra Blanca, or White Mountain, had been selected previous to his departure from Camp Goodwin, several weeks ago. This is certainly a move in the right direction. Many villainous Apaches dwell in the White Mountain country, and the establishment of a strong post in their midst will, most assuredly, check and have a depressing influence upon them, and also open the country to settlement. The new post will be about sixty-five miles north-east of Camp Goodwin, which is about one and-a-half miles east of the Gila; about two hundred miles south-east from Prescott, and one hundred and sixty miles north of Tucson."

THRILLING ADVENTURES OF A PROSPECTING PARTY—MINING REVIVAL.

From the Prescott (Arizona) *Miner*, of April 2d, we cull the following: "When the Richardson party divided near Mount Floyd, eighty or ninety miles north-east from Prescott, twenty-one of the party turned their faces this way, and the remainder started for Cataract creek, to look at a patch of country which they had, on a foamer trip, seen from a distance, and in which they supposed gold existed. The first party had traveled about six miles towards Prescott, when three of their number—Edward Pearl, —— McDonald, and Ferdinand Wonder—seceded, and with a burro, on which they packed their blankets and provisions, started for the Little Colorado. Two of this latter party got back here Saturday last, and related a fearful tale of Indian duplicity, treachery and murder. We give it as related to us: Shortly after leaving their companions, the little party of three struck an Indian trail and followed it northward. They soon reached a creek which they supposed to be Diamond creek. Here they met a party of Wallapais Indians, who acted very friendly, and showed 'peace papers' from some army officer. This satisfied the whites, who then turned east. They traveled two days, and the night of the second reached a country that looked exceedingly well for gold, the beds of the streams being filled with granite and quartz boulders and gravel. Timber and game abounded. The party unpacked the burro, cooked and ate supper, and retired to dream of what they might find next day. During the latter part of that night their ever faithful burro awoke the party by certain antics which all burros cut up upon seeing anything unusual—more especially in the dread hours of the night. But, alas for the men, they paid no attention to the snorting of the donkey, and fell back again into sound sleep, from which they were aroused, about daylight, by a party of four savages, who had crawled to their beds and opened a murderous fire upon them with bows and arrows. Upon seeing how matters stood, the whites grasped their weapons, turned loose upon the savages, and drove them away. The result of the fight was as follows: Ferdinand Wonder was mortally wounded, and McDonald and Pearl were wounded in several places—not seriously enough, however, to prevent them from travelling. They looked around for the burro, and not seeing him, concluded that the Indians had gobbled him. They then packed their blankets on their backs, took hold of Wonder, and assisted his tottering footsteps. They had proceeded scarce a hundred yards, when Wonder, from whose wounds the blood spurted, informed his comrades that it was impossible for him to travel any further, even with their assistance, and begged them to shoot him. This they would not do, so he immediately shot himself in the head with his six-shooter. McDonald and Pearl remained by his side until satisfied that he was dead, when they took up his arms and proceeded on their way. They travelled two days and nights without water, preferring to suffer for want of it rather than risk their lives by hunting for it in cañons and brushy places, where, had they entered, the savages, who had dogged their steps all the while, would most assuredly have surrounded and murdered them. From Anvil Rock they followed the road to Camp Toll-Gate, where, after relating the desperate trials and sufferings they had gone through, everything possible was done for them. The men think they killed and wounded some Indians. They think there were some twenty or thirty Indians on hand the morning of the fight. They feel pretty certain that the attack was made, and the murder committed by Wallapais, with, perhaps, a few Pah-Utes. Ferdinand Wonder, the man who lost his life on this trip, was from Iowa, where, we are told, his relatives reside. Thus endeth another bloody chapter in the remarkable bloody history of this Territory.

"At latest dates from Big Bug, Gray & Co.'s ten-stamp mill was working away on ore from the Eugenie extension. Messrs. Gray and Boggs started over Wednesday last, and had not returned when our paper went to press, so that it is impossible for us to give the result of the last run. The placer miners had commenced operations in the old Mexican gulch. B. Hussey and H. Bowers reached town on Thursday evening last, from a visit to Walker and Hassayampa districts. From them we learn that the Eureka ten-stamp mill, after having run a short time on ore from the Box Elder, broke a part of its machinery, when it was shut down for repairs. Messrs. Tiernan and Jackson thought they would make a success. Some good looking ore from the Pine Mountain was being hauled to the mill. All the arastras and the hydraulic claims of Wells, Bowers & Bean were running. Water was getting scarce, and it was not expected that work could be carried on in the hydraulic claims for any great length of time unless more rain or snow should descend. It was thought that the claims were paying well. Those working with sluices and rockers were making fair wages. One of the Bashford Mining Company came over from the Lynx creek diggings on Wednesday last, and informed us that himself and two other men took out in four days gold dust to the amount of $52; that, too, with a very small head of water. Were there plenty of water, the diggings would pay $10 a day to the hand. Burns & Co., three men, at work on the opposite side of the creek, were making about $4 a day with rockers. Another company of five men were digging a ditch to carry water on the Frenchman's bar, in which they had found large beds of gravel which prospected from two to twenty-five cents to the pan. They were in a hurry to get water on the bar, believing that they had struck rich diggings. The bar is a large one, and in some places quite deep. To sum up, we say in all candor and seriousness, that mining matters here look exceedingly bright, and that but for our isolated position, and the accursed red-skins, Arizona would stand second to no mining State or Territory. At the sale of 'feet' here, on Saturday last, two hundred feet of mining ground, in Big Bug district, brought $800."

British Columbia.

We have Victoria, (V. I.) dates to April 13. An almost inexhaustible supply of anthracite coal has been discovered on the Skidegate Bay, which is now being worked, and some of the coal has been brought to Victoria. The vein is five feet thick.

The Walla Walla *Statesman*, of April 9th, condenses the following news from the Kootenai country (British Columbia): "Letters from Mr. John Galbraith state that a perfect stampede has taken place to the new (Cedar creek) mines, and that the Jack Fay's shaft is secure. Yet there will remain a great many who have good claims. There are about three hundred men in the camp, whites and Chinese. The large supply of goods received last fall has supplied the camp well, and consequently goods of all descriptions are low and plenty. There is not enough of cattle to last longer than July. Shaw, Taylor, Phelps, and Marzau, are farming on an extensive scale. The Indians returned from their winter hunt in the Blackfoot country, and were very successful. The Blackfeet are anxious for a treaty. They have been at war with the Kootenais for the last twelve years, and report that the small-pox and the soldiers have made them pretty quiet. They are all going north to the great Saskatchewan Valley. Mr. Herbert reports snow on the Moyea about four feet deep, and in the Pack river country it was about four feet deep. He is satisfied that most of the miners who have left Kootenai will return, as they left their partners to represent their ground. The winter has been very mild, and stock has done well."

BUSINESS AND PERSONAL.

[*Short notices in this column fifty cents per line each insertion.*]

GLYNN'S ANTI-INCRUSTATOR FOR STEAM BOILERS.—THE only and reliable article for removing and preventing incrustation. No foaming, and does not attack metals of boiler. Liberal terms to agents. C. D. FREDRICKS, 587 Broadway, N. Y.
April 19 tf.

MARKET REVIEW.

The Coal Trade.

NEW YORK, May 13, 1870.

WHOLESALE.—There seems to be a slight improvement in the demand for coal this week. Two weeks ago, to call upon a retail dealer and offer him coal, was nearly equal to an insult. There must be considerable trade doing, when we note that the larger companies are bringing to market a larger tonnage than ever before, and it is easily taken by the North or West. Prices, however, remain unchanged, but any forcing would quickly break the market. Dealers are unconcerned as regards the Schuylkill county strike provided the men do not influence the other regions to join them. The Lehigh and Lackawanna districts are furnishing all the coal we can comfortably use, which sustains prices. A new plan of the present strike now going on in Schuylkill reaches us by telegraph this morning:

IMPORTANT MEETING OF COAL OPERATORS.—NO SURRENDER.

[*By Associated Press.*]

POTTSVILLE, May 12.

This afternoon a very large and enthusia-tic meeting of the coal trade was held at the Anthracite Board of Trade Rooms. The officers of the meeting of March 15th presided.

Addresses were delivered by Messrs. Jesse M. Cooke, John E. Graeff, Colonel Cessner, Messrs. Griscom, Thomas, Neill, and other gentlemen.

The Committee on Resolutions reported the following, which were adopted unanimously, amid much enthusiasm.

Whereas, At a meeting of the coal trade, representing from four to five millions of tons per annum, held in Pottsville on the 15th of March last, it was resolved, in a spirit of liberality to the working men, to offer them a basis of $2 50 per ton for coal at Port Carbon, notwithstanding that they were convinced that such an offer was not warranted by the condition of the market; and

Whereas, We have every reason to believe that the majority of the working men are and have been ready to accept our offer, but for the influence of a few ruling spirits, who, for their own selfish ends, are injuring both the employers and the employees, and who, by their foolish and short-sighted councils are driving all capital and enterprise from this region; therefore,

Resolved, That although the present state of the market is more depressed than at the date of said meeting, yet we will adhere to our offer to the men, and will not start our collieries until the men accept our terms.

Resolved, That any operator having pledged himself to abide by the action of said meeting, and having started his colliery and shall continue to work, regardless of said pledge, has thereby forfeited his claim to the respect and confidence of the whole community.

Whereas, The Philadelphia Coal Company have violated their written pledge by starting their collieries upon terms contrary to the action of said meeting; therefore

Resolved, That we do hereby pronounce the said Philadelphia Coal Company, their officers and Superintendent, void of all honor, and unworthy of the confidence of this community, and we denounce them as such.

Resolved, That the almost unanimous suspension of the Shamokin region, last night, gives us renewed assurance of success in our movements, and we heartily commend them for their action in stopping.

Resolved, That the thanks of the whole trade are due, and are hereby tendered to the Executive Committee of the Board of Trade, and those who have assisted them in their labors, for their ceaseless vigilance and untiring exertions to make the supension effectual.

We are very happy to see the operators continue to stand firm to their cause. They are in the right, and triumph they must. Sooner or later the miner will learn that his best friends are those who now appear his most bitter enemies. We think the meeting placed too much importance upon the action of the Philadelphia Coal Company, and the backsliding of their President, Henry L. Cake, and Superintendent G. W. Huntzinger. It is well known that Mr. Cake desires the suffrages of the miners to keep him in the public position he now occupies. Let them look out for a "wolf in sheep's clothing." It seems as though this small company, failing of ever becoming known in coal circles, sought advertisements and notoriety in this way, as being the cheapest. Another reason given in the market is the straightened condition of their treasury, which compelled them to go to work and send some coal forward. Taking all their points into consideration, we think, as we said before, that too much importance has been placed upon their action. The above resolutions certainly show determination on the part of the operators to hold out till the miner sees the error of his way, and we again offer our advice to the miners to accept reasonable terms while an opportunity offers.

There is not much cheerfulness in the future of the trade. Continued idleness is an irretrievable loss to the miners only. It is impossible to deplete the market by remaining idle, and thereby enhance prices to make up for lost time. The regions furnishing coal now give all that the country requires. Let the miners go to work when they will, the effect can only be a general reduction in prices. The liberal offer on the part of the operators should be well considered; indeed we are much surprised that the terms are so liberal, for they are really more advantageous than can be well afforded. Their offer in a few weeks may be withdrawn, and a "basis" of all and every kind refused. Capital must be protected, or it will be withdrawn entirely from these turbulent sections. See to it, miners, that you do not drive it away. The great companies in the Wyoming region are reaping a rich harvest off your present wayward course. Did they believe it was your intention to resume, they would, no doubt, gladly pay handsomely to have you continue in your present position. We therefore urge you once again to draw aside from those who claim to be your leaders, but who show a total ignorance of what they would endeavor to instruct you in. Give no heed to their counsels, but come out like men, and act with your true friends, who are in the majority, by accepting the propositions of the operators. We are assured that this is the best the present market can afford, and we advise you to go to work immediately on their basis. Unless you can force the Lehigh and Wyoming men to join you in this strike, it will be fruitless of any good to you, depend upon that; and as the last mentioned miners do not seem to have much sympathy with you, you had best look to your own interests, and commence providing for your families. "Make hay while the sun shines." Provide for your families *now*. The necessities of a winter season *are before you*—and must be cared for.

There has been much complaint of late among dealers of the dishonesty of captains of vessels which carry coal, causing, oftentimes, much trouble and many disagreements between them and their customers on claims for short weight; oftentimes these claims have been as much as eight or ten tons on a small cargo. It seems that the captains purloin and dispose of this coal for their own profit; and we are not aware how true it is, but we learn that certain tugs plying between this port and Elizabeth are entirely supplied with coal in this way. This is a great and growing evil, and of late has become unbearable, and should be stopped forthwith. On Tuesday last Messrs. White, Fowler & Snow, large dealers in coal, in Trinity Buildings, hauled up the captain of the boat "J. C. Skadden"—one C. W. Benson—who had stolen some eleven tons of a cargo of coal committed to his care. He confessed to have sold this coal to F. & A. McQuade, retail dealers in this city. McQuade endeavors to exonerate himself from the purchase of this coal, at $1 20 below the market price; but this ruse is altogether too thin, and we should think he would be ashamed of the "nasty job" he has been caught in. Messrs. W. F. & S. intend putting this "son of a sea-horse" where he will, in all probability, have an opportunity this winter to muse on the furtive beauties of the coal trade and its many ramifications. We would caution dealers to be on the lookout for these chaps in the future, and a few such examples will, in all probability, entirely free the trade of this nuisance. Give us a Coal Exchange to remedy this and other evils!

RETAIL.—Now that families are certain of a place of abode for another year, and as the month of June is on its way hither, they are looking about for a supply of coal for the winter, and we note an increased business during the past week at all the retail yards at old prices. Pittston and Lackawanna from $3 50 to $6 50. Lehigh coal, $7 50 to $8 00.

FREIGHTS.—Vessels are not in over supply, but rates have not advanced, the weather for boating is and has been fine, and captains make but little trouble about the rates.

BITUMINOUS.

There is a fair business doing, and we hear of many contracts being made for steamer and manufacturing purposes. There also promises to be a good retail trade done in Bituminous coals in this city eventually; many yards are making provision to keep them on call.

We would refer our readers to a full and corrected report of the action of Messrs. Audenreid & Co. against the Philadelphia and Reading Railroad Company, made mention of in our last issue, which will be found in another part of this week's JOURNAL.

Anthracite Coal Trade for 1869 and 1870.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending May 7, 1870, compared with week ending May 8, 1869.

COMPANIES.	1869. WEEK.	1869. TOTAL.	1870. WEEK.	1870. TOTAL.
*Phila. & Reading R.R.	35,561	1,172.638	27,675	869,729
Schuylkill Canal	23,857	103,857	1,503	22,709
Lehigh Valley R. R., N.			5,561	104,617
" " S.	51,223	936,164	66,0-6	1,116,039
L. Coal & Nav. Co. R R.	22,-51	286,682	25,761	319,041
Lehigh Canal	29,012	159,939	5,407	35,320
Scranton North	9,214	181,890	10,422	214,208
" South	34,207	539,787	40,457	599,360
Penn. Coal Co., rail	19,123	275,966	27,118	359,209
" " canal	478	2,133	595	2,254
Del. & Hud. Canal Co.	48,345	237,072	52,307	220,915
" " R. R.	6,430	93,632	5,635	184,307
" " south	4,066	79,536	13,189	111,746
Shamokin	9,576	129,554	7,110	100,646
Trevorton		7,054	2,754	21,987
Lykens Valley Coal Co.	1,173	16,832		
Wyoming South	739	12,799	9,572	17,263
" North				
P. N. Y. C. & R. R. Co.			5,561	105,037
Williamstown, Coal'y	5,695	55,259	6,765	88,454
Short Mountain	2,822	26,613		
Total	304,434	4,307,507	313,475	4,497,201
1869			304,434	4,337,507
Increase week and year			9,041	159,694

* Less coal transported for Company's use and Bituminous coal.

Bituminous Coal Trade, 1869 and 1870.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending May 7, 1870, compared with week ending May 8, 1869.

COMPANIES.	1869. Week.	1869. Year.	1870. Week.	1870. Year.
B. & O. R. R.	24,706	265 261		
C. & O. Canal	15,496	76,827		
H. & B. T. R. R.	6,339	107,468	6,690	96,453
Harrisburg & D.			16,456	197,716
L. V. R. R.				5,156
P. & N.Y. C. & R. Co.			5,215	71,872

Schuylkill Coal Trade.

Report of Coal transported via the P. and R. R. for the week ending May 7, 1870—less coal carried for Company's use, and Bituminous Coal:

For week	27,675 16
Previously this year	842,053 08
Total	869,729 04
Same time last year	1,172,638 00
Decrease	302,908 16
Amount sent same week 1869	35,561 00

Report of coal transported on the Philadelphia and Reading Railroad for the week ending Thursday, May 5, 1870:

From St. Clair	
" Port Carbon	1,404 07
" Pottsville	215 04
" Schuylkill Haven	16,642 17
" Auburn	1,160 10
" Port Clinton	3,290 16
" Allentown and Alburtis	4,382 02
" Harrisburgh and Dauphin	16,456 05
Total paying freight	44,132 01
Coal for Company's use	3,232 10
Total for week	47,364 11
To same time last year	1,073,279 00
Total	1,120,643 11
To same time last year	1,373,381 19

Report of coal transported over the Schuylkill Canal for the week ending Thursday, May 7, 1870.

	Tons. Cwt.
From Port Carbon	461 00
" Pottsville	
" Schuylkill Haven	1,039 00
" Port Clinton	
Total for week	1,500 00
Previously this year	21,209 02
Total	22 709 02
To same time last year	163.857 03

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company, for week ending Saturday, May 7, 1870.

	WEEK.	SEASON.
North	48,002 17	778,090 12
South	13,188 15	111.746 10
Total	61,191 12	889,837 02
Corresponding time in 1869.		
North	41,984 10	665,017 04
South	4,066 02	37,819 00
Total	46,050 12	702,836 04
Increase North	6,018 07	Increase 113,073 08
Increase South	9,122 13	Increase 73,927 10
Total Increase	15,141 00	Increase 187,000 18

Report of Coal Transported by the Lehigh Coal and Nav. Co.'s Railroads and Canals,

Week ending May 7, 1870—Compared with same time last year.

WHERE SHIPPED FROM	WEEK, 1870. tons ct	WEEK, 1869. tons ct	YEAR, 1870. tons cwt.	YEAR, 1869. tons cwt.
Wyoming Region	30215 01	23857 17	334662 09	241596 08
Upper Lehigh Region	3935 01	3305 07	3.019 02	55:99 04
Mahanoy Region		35 00		727 01
Hazleton Region	3151 04	9310 07	18498 10	47963 06
Beaver Meadow Region	1595 08	3586 07	9241 03	21590 04
Mauch Chunk Region		14576 00	30089 18	114970 03
Totals	38896 14	54730 13	425511 02	472856 01
Increase				
Decrease	15833 19		47344 19	
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	25761 16	22853 19	319001 12	286982 07
Forwarded East of Mch Chunk by Canal	5407 09	29012 15	35326 05	159939 10
Delivered at and above Mauch Chunk	844 18	950 11	13013 06	14052 18
Delivered to L. & B. R. R. at Plymouth Bridge	6892 11	1913 08	58175 19	120:1 03
L. V. R. R. at Sugar N.				5:00 03
Totals	38896 14	54730 13	425511 02	472856 01
Of the above there was from Mines controlled by Co., W. B.C. & I.Co	14654 04	10688 01	132550 17	114214 03
L. C. & N. Co	3:2 04	1:285 09	46849 19	114970 03
Totals	15036 08	25973 13	179200 16	229184 06
Increase				
Decrease	10937 02		49983 10	

Harrisburgh and Dauphin Coal Trade.

The following is the amount of Bituminous Coal transported via the P. and R. R. for the week ending May 7, 1870:

	Tons.
For week	16,456 05
Previously this year	181,258 17
Total	197,715 02

Report of Coal Transported over Lehigh Valley Railroad

For the week ending May 7th, 1870, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.	PREVI'S Y. Tons. Cwt.
Total Wyoming	13,908 01	242,741 04	256,649 05
" Hazleton	43,283 06	648,1:1 07	691,414 13
" Upper Lehigh	278 10	4,634 10	4,913 00
" Beaver Meadow	17,546 00	209,014 08	226,552 08
" Mahanoy	2,516 19	96,144 08	98,661 07
" Mauch Chunk		447 17	447 17
Total Anthracite	77,532 16	1,201,171 14	1,278,704 10
Bituminous Coal recv'd from Cata. R. R.			
N. C. R. R.			
E. P. R. R.		5,156 00	5,156 00
P. & N.Y. C. & R.R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	77,532 16	1,206,327 14	1,283 860 10
Same time last year	65,141 13	980,8:5 17	1,045,967 10
Increase	12,391 03	225,501 17	237,893 00
Decrease			
Forwarded East from M'h Chunk by rail	66,668 11	1,049,970 17	1,116,039 08
Same time last year	51,223 01	884,941 08	936,164 04
Increase	14,845 10	165,029 09	179,874 19
Decrease			

RECAPITULATION.

Forwarded East from M'h Chunk by rail	66,668 11	1,049,970 17	1,116,039 08
To N. C. R. R., at Mount Carmel		115 00	115 00
Forwarded North from L. & B. Junction	5,561 02	99,056 07	104,617 09
To L. & S. R. R. at Packerton for rail	85 14	3,268 14	3,354 08
Delivered at M'h Chunk	12 03	528 06	540 09
Delivered on line of road above Mauch Chunk	100 00	6,172 06	6 272 06
Delivered above M. Chunk for use of L. V. R.R.	1.052 10	21,139 11	22,192 01
To L. & S. R.R., at P'n Hav., for railroad			
Do. for canal	3.057 08	12.540 07	15,597 15
At M.Chunk for canal	1.5:5 08	8.380 06	9,:75 14
Total Anthracite	77,532 16	1,201,171 14	1,278,704 10
Bituminous Coal		5,156 00	5,156 00
Total all kinds	77,532 16	1,206,327 14	1,283,860 10

Penn. and N. Y. Canal and Railroad Co.

REPORT of Coal Transported via the Pennsylvania and New York Canal and Railroad Company, for week ending May 7, 1870:

	WEEK.	PREVIOUSLY.	TOTAL.
Anthracite	5,156 02	99,476 05	105,037 07
Bituminous	5,215 00	66,658 00	71,873 00
Total, Ant. and Bit.	10,776 02	166,134 05	176,910 07

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven $2 00

From Port Carbon, 8 cents per ton more.

Less drawback of 80 cents on all Coal shipped east of New Brunswick and south of Cape Henry,

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$ 81
C. R. R., N. J., Easton to Elizabethport	1 12
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 28

MAUCH CHUNK TO PORT JOHNSON.

L. V. R. R., or L. & S. R. R. from M. C. to Easton	$ 81
C. R. R., of N. J., Easton to Pt. Johnson	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Easton	$ 81
Morris & Essex R. R. Easton to Hoboken	1 19
Shipping expenses	25
Warfage	10
Total	$2 35

TO SOUTH AMBOY.

L. V. R. R.	81
B. & D. R. R. / Cam. & Am. R. R.	1 09
Shipping Expenses	25
Total	$2 15

PENN HAVEN TO ELIZABETHPORT.

L. V. RR. Penn Haven to Easton	95
C. RR. of N. J. Easton to Elizabethport	1 19
Shipping expenses	25
Wharfage	10
Total	$2 49

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 07
" Port Carbon	1 10
" Port Clinton	1 00

TO NEW YORK.

From Schuylkill Haven	$1 70

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$0 70
Freight and towage	1 07
Total	$1 77

TO NEW YORK.

Lehigh Canal	$ 40
Morris " / Freight / Towing	1 10
Total	$ 2,50

TO JERSEY CITY.

Lehigh Canal	$ 40
Morris " / Freight	2 00
	2 40
For re-shipment	2 20
Total	$

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 40
Delaware Division Canal	30
Delaware and Raritan Canal	35
Freight	1,25
Towage	20
Total	$ 2,50

TO NEW BRUNSWICK.

Lehigh Canal,	$ 40
Delaware Division Canal,	30
Delaware and Raritan Canal,	35
Freight,	1.05
Total,	$ 2,10

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Freights.—MAY, 1870.

TO EASTERN PORTS.	From Philadelp'a.	From E. Port and Port Johnston.	From Newburg	From Roadout
Amesbury	$2 75	$- -	$ 75	$
Bangor	2 75	2 00	1 90	
Bath	2 75	2 00	1 85	2 00
Boston	2 00	1 85	1 80	2 00
Bridgeport	1 65	1 00	1 20	1 25
Bristol	2 00	1 40	1 45	
Cambridgeport	2 50	2 00	1 90	
Derby	2 00	- -		
Dighton	- -	- -	1 50	
East Cambridge	2 50	2 00	2 00	
Fall River	1 75	1 40	1 45	
Hackensack	1 95	1 50		
Hartford	2 75	1 50		
Jersey City	1 75	50		
Middletown	- -	1 25		
Mystic	2 00	1 40	1 35	
New Bedford	1 75	1 50		
Newburyport	2 00	2 00	1 90	
New Haven	1 70	1 00	1 20	1 25
New London	2 00	1 50	1 30	1 40
Newport	1 75	1 40	1 45	
New York	1 25	50	70	
Norwalk	1 75	1 00	1 15	
Norwich and tow	1 70	1 40	1 40	1 50
Pawtucket	1 90	1 50	1 65	
Portland	1 75	1 75		
Portsmouth, N. H.	2 25	2 15	1 90	2 10
Providence	1 75	1 40	1 50	1 55
Rockport	2 10	- -		
Saco	2 50	2 10		
Sag Harbor	2 00	1 40	1 35	
Salem	2 25	2 00	1 80	2 00
Stamford	2 00	1 00	1 10	
Stonington	2 00	1 40	1 30	
Taunton	2 75	2 00		
Warren	- -	1 40	1 50	
Washington	1 10			
TO RIVER PORTS.				
Albany		1 00	- 60	
Catskill		- —	- 50	
Cocksackie		- —	- 50	
Coeyman's		- —	- 75	
Cold Spring		- —	- 35	
Fishkill		- —	- 30	
Haverstraw		50	- 60	
Hudson		- —	- 50	
New York		- —	- 70	
Nyack		50	- 60	
Poughkeepsie		- —	- 35	
Rhinebeck		- —	- 30	
Rondout		- —	- 50	
Saugerties		- —	- 40	
Sing Sing		- —	- 75	
Stuyvesant		- —	- 55	
Tarrytown		60	- 75	
Troy		1 00	- 75	
West Point		- —	- 35	
Yonkers		40	- 60	

Foreign and Provincial Freights.

May, 1870.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-3 tons	£13 10@£14 10
Liverpool	12s.6d@14.ton

TO NEW YORK.

Provincial

Sidney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$—
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven,	$ 40
Bridgeport,	40
Southport,	40
Westport,	40
Norwalk,	40
Stamford,	40
	Per Boat.
Greenwich,	$70 00
Port Chester,	80 00
Mamaroneck,	70 00
Glen Cove,	55 00
New Rochelle,	55 00
East Chester,	60 00
West Chester,	30 00
White Stone,	30 00
College Point,	25 00
West Farms,	25 00
Flushing,	30 00
Harlem and Mott Haven,	20 00
Port Morris,	20 00
Ninety-first street and Astoria,	16 00

Boats beyond Port Chester, with less than 200 tons, $80 per Boat.

TO RIVER PORTS.

Boats of 150—250 Tons.	Per Ton.
To Manhattanville,	8 cents
Spuyten Duyvil,	8 "
Yonkers,	9 "
Hastings,	10 "
Piermont,	12 "
Dobbs' Ferry,	12 "
Nyack,	14 "
Tarrytown,	15 "
Sing Sing,	16 "
Croton Landing,	17 "
Haverstraw,	17 "
Verplanck's,	17 "
Peekskill,	18 "
West Point,	20 "
Cold Spring,	20 "
Newburgh,	18 "
Poughkeepsie,	22 "
Rondout,	23 "

Boats of 100 Tons	Per Boat.
To Manhattanville, and Return,	$11 00
Spuyten Duyvil, "	13 00
Yonkers, "	15 00
Sing Sing, "	20 00
Peekskill, "	25 00

Prices of Coal by the Cargo,

[CORRECTED WEEKLY.]

	AT NEW YORK, May 13.		AT PHILADELPHIA, May 12.	
SCHUYLKILL.	R. A.	W. A.	R. A.	W. A.
Lump	$— —	$5 00	4 50	— —
Steamer,	— —	5 25	— —	— —
Broken,	— —	— —	— —	4 50 to — —
Egg,	5 75 to 6 25	5 50	— —	4 50 to — —
Stove,	— to — —	6 00	— —	4 50 to — —
Chestnut,	4 50 to 5 40	5 00	—	4 00 to —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	6 00	— —	— —	— —
Broken	6 00	— —	— —	— —
Egg	6 00	— —	— —	— —
Stove	6 25	— —	— —	— —
Chestnut	5 50	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A.	— —	— —	— —
New England	"	— —	— —	— —
Locust Dale	W. A.	— —	— —	— —
Honey Brook, Le'h	W. A.	4 75 to 5 75	— —	— —
Spring Mountain	"	4 75 to 5 75	— —	— —
Sugar Creek	"	4 75 to 5 75	— —	— —
Sugar Loaf	"	4 75 to 5 75	— —	— —
Old Comp'y's.	"	4 75 to 5 75	— —	— —
Cross Creek	"	4 75 to 5 75	— —	— —
Enterprise	"	— —	— —	— —
Girardville	"	— —	— —	— —
McMichael	"	— —	— —	— —
Shamokin	"	5 50	4 50	— —
Lykens Valley	"	— —	— —	— —
Broad Top	"	5 50	— —	— —
Hill & Harris.	"	— —	4 50	— —
Henry Clay	"	— —	4 50	— —
Powelton	"	5 50	4 50	— —

Prices for Coal at Mauch Chunk.

	F.L.	Bro.	Gra.	Eg.	Sto.	Cst.
Lehigh	$3 50	$3 50	$3 50	$3 50	$4 00	$3 25
Wilkesbarre	3 50	3 50	3 50	3 50	4 00	3 25

For freight to Elizabethport and to New York see "Freights."

BITUMINOUS COALS.

Kittaning Coal Co.'s Phœnix Vein..f.o.b. at Phila.	$5 00
Lemon " " "	4 75
Cumberland Vein Coal	5 00
Cumberland C. & I. Co.'s on board N. Y.	7 00
Maryland Coal Co. "	7 00
Consolidated Coal Co.'s "	7 00

*Dealers in these coals may be found in our advertising columns.]

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Ches.
Scranton at E. Port	4 50	4 60	4 75	5 00	5 75	4 60
Pittston at Newburgh	4 50	4 80	4 90	5 00	5 45	4 70
Lackawana at Rondout	4 50	4 85	4 90	5 10	5 75	4 50
Wilk'b're at Hoboken.	4 75	4 75	4 25	5 25	5 75	4 75
Old Co. Lehigh at Pt. Johnston	— —	— —	— —	— —	— —	— —
Lehigh at E. Port	5 50	5 25	5 25	5 25	5 75	4 75

For freights to different points, see "Freights."

Prices of Foreign Coals.

May, 1870.
Duty $1 25 per ton.
Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	10 00@12 00
" House "	13 50@15 50
" " Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.
PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" " Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Prices of Gas Coals.

May, 1870.
PROVINCIAL.
Corrected weekly by Louis J. Belloni, Jr. 73 Pine st., N.Y.
Duty, $1 25, gold.

	Coarse.	Slack.
Block House	$1 75	@— 75
Gowrie	1 75	@— 75

Corrected by Bird, Pickens & Job, 86 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@— 80
Lingan	1 75	@— 80
Little Glace Bay	1 75	@1 00
Caledonia	1 60	@— 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.
AMERICAN.

	Coarse.	Slack.
	Currency.	
Fairmount Gas Coal Co. of N. Y.	7 50	@— —
Despard Coal Co.	$7 50	@— —
Penn.	— —	@— —
Newburg Orrel Gas.	— —	@— —
West Fairmount Gas Coal	— —	@8 00
AT PHILADELPHIA.		
Powelton		$7 80

Prices at Baltimore—May, 1870.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 30@5 30
Pittston and Plymouth	5 80@— —
Shamokin Red or White Ash	5 75@6 00
Lykens Valley Red Ash	— —@6 50
Zerba Valley 75c. to 1,00 additional from yard	5 50@6 25
Trevorton, Red Ash	6 00@6 50
By retail, all kinds per ton of 2240 lbs.	7 25@8 50
Georges Creek & Cumberland f. o. b. at Locust Point for shipping	4 75@5 00
West Fairmount Gas f. o. b.	5 25@5 50

Prices at Georget'n, D.C., & Alexandria, Va.

May, 1870.
George's Creek and Cumberland f. o. b. for shipping..$4 55

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$— —@— —
Lykens Valley	— —@— —
Shamokin Red or White Ash	— —@— —
Trevorton and Zerba Valley	— —@— —

METALS.

NEW YORK, May 13, 1870.

IRON.—Duty: Bars, 1 to 1½ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, 9 ₱ ton; Polished Sheet, 3 cents ₱ lb.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	34 50@37 00
Pig, American, No. 1	33 00@34 —
Pig, American, No. 2	31 —@32 —
Pig, American, Forge	29 —@30 —
Bar, Refined, English and American	— —@75 00
Bar, Swedes, assorted sizes (gold)	85 00@97 50
Bar, Swedes, ord'y sizes, less 5 ₱ ct.	115 —@125 —
Bar, Refined " "	77 50@— —
Bar, Common " "	72 50@— —
Scroll " "	87 50@115 —
Ovals and half-round " "	85 —@110 —
Band " "	95 —@— —
Horse Shoe " "	95 —@— —
Rods, ⅜ to 3-16 inch " "	85 —@120 —
Hoop " "	105 —@145 —
Nail rod, less 5 ₱ ct.	— 7 @— 7¼
Sheet, Russia, as to Nos. (gold)	— 11 —@— 12 —
Sheet, Single, D, and T. Common	— 4½ —@— 5½
Sheet, Galv'd, Nos. 14 to 26 List 15, 16 and 17 c. 25@30 p.c. off	
Rails, English (gold), ₱ ton	59 00 @60 00
Rails, American, at Works in Pa.	71 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 2½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.)

English Cast (2d and 1st quality)	₱ lb	— 15	@— 18
English Spring (2d and 1st quality)		— 7	@— 10
English Blister (2d and 1st quality)		— 10	@— 17
English Machinery		— 11½	@— 14
English German (2d and 1st quality)		— 13	@— 15
American Blister "Black Diamond"		— —	@— 12
American, Cast, Tool	do.	— —	@— 18
American, Spring,	do.	— 9	@— 12
American Machinery,	do.	— —	@— 12
American German,	do.	— 10	@— 12

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 20 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 31
Copper Bolts	— @— 31
Copper Braziers, 16oz. and over	— @— 31
Copper Nails	36 @— —
Copper, Old Sheathing, &c., clean	17 @— 18
Copper, Chili Pig	— @— —
Copper, American Ingot	18½ @— 19¼
Yellow Metal, New Sheating	24 @— —
Yellow Metal Bolts	24 @— 31
Yellow Metal Nails	— @— 24

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1½ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs	$— — @— —
Spanish (gold)	6 20 @6 25
German, do.	6 20 @6 37½
English, do.	6 20 @6 62½
Bar (net)	— — @ 7 70
Pipe and Sheet (net)	— — @ 7 70

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent. ad val.

	Gold ₱ lb.
Banca	— @45
Straits	35 @35½
English	— @33

PLATES.

	Fair to Good Brands. Gold.	Currency.
I. C. Charcoal, ₱ box	$8 50 @8 75	$10 00 @15 50
I. C. Coke	7 — @7 75	8 25 @ 9 25
Coke Terne	6 — @6 25	7 25 @ 7 50
Charcoal Terne	7 75 @8 25	9 — @ 9 75

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ₱ 100 lb.

	Gold.
Plates, Foreign ₱ 100 lbs.	$6 00 @6 25
Plates, Domestic ₱ lb.	10 @— 11½

REMARKS.

IRON.—There has been a little more inquiry for Scotch Pig, but the market is only moderately active, as consumers are unwilling to purchase beyond immediate wants at present prices; the sales are 100 tons Eglinton at $34 50, ex-ship; 100 do. Gartsherrie, $36, from yard; and 200 do. Glengarnock, to arrive, on private terms. American continues in fair request, but prices are inclined to soften, though, as yet, no quotable change has been made; 2,000 tons Manhattan Forge sold on private terms; and 150 do. Charcoal, $54, at Hoboken. One hundred tons Wrought Scrap, ex-yard was reported to us at $37 50, but holders are mostly firm at $38@39 ex-ship, and $40 from yard. New Rails have been quiet, but prices are unchanged. Old are scarce and in demand at steady prices; 1,000 tons old T sold at $42; and 600 do. Double-headed, $44 currency. Bar from store continues quiet, but rather firm at quotations. We note a sale of 500 packs. Refined Sheet, part to go to Boston, on private terms.

Import from January 1st to April 30th, 1870.

	Bar. Tons.	Pig. Tons.	Sheet. Bdls.
From Foreign Ports	4,100	10,700	83,420
Coastwise	....	....	....
Total	4,100	10,700	83,420
Same time, 1869	5,984	15,323	120,771

LEAD.—Pig has been in limited demand, and we have only to notice the sale of 25 tons Spanish ex-ship at $6 25 gold. Bar, Pipe and Sheet are firm at previous quotations.

Imports from January 1st to April 30th, 1870.

	Pigs.
From Foreign Ports	158,678
Coastwise Ports	1,301
Total	159,979
Same time, 1869	174,530

COPPER.—New Sheathing is steady at 31c., and Yellow Metal 24c. cash. Ingot is still dull and prices are without improvement; sales have been made of 100,000 pounds Baltimore at 18½c.; 50,000 pounds do. 18⅝c.; 60,000@70,000 pounds Lake Superior, 19@19½c.; and some few purchases of the latter, for future delivery, 19c. cash.

STEEL.—Is without considerable movement.

TIN.—The European advices relative to Pig continue to be of a favorable tenor, and there has been again quite a large business, at a further advance in prices, the tendency at the close being still in sellers' favor. The transactions embrace 1,800 slabs Straits and Billiton, here and in Boston, from ship and store, at 34½@35c.; 500 do. to arrive at Boston, 34½c.; 300 do. here 34⅜@35¼c.; 100 do. 35½c.; and 10 tons English 34½@34¾c., now held at 35c. Banca very scarce, nominally 45c., all the above gold. For Plates there is rather more demand, and, with advancing prices for Pig, prices are very firm, though not quotably higher; sales have been made of 500 bxs. ½d X Charcoal Tin at $7 75; 250 do. I. C. Coke, 10 by 14, $7 25; 1,000 do. Charcoal Terne, $7 75; 500 do. $8, all gold; and 2,000 do. Assorted Charcoal Tin, on private terms.

Imports from January 1st to April 30th, 1870.

	1870.	1869.
Pigs	No. 18,526	25 002
Plates	bxs. 216,627	306,906

SPELTER.—Is quiet but steady; 10 tons Silesian sold at $6 12½ gold; that noticed in our last should have read $6 20.

Imports from January 1st to April 30th, 1870.

	Plates.
1869	139,732
1868	188,944

ZINC.—American Ox. Zinc, 6½ @ 7c.; French do. 9½ @ 10c.; Sheet Zinc, 9 @ 10c.

MANGANESE.—Lump, 4½@5c.

Mining Stocks.

NEW YORK, May 12, 1870.

Mining Stocks are still further depressed in comparison with our last and our quotations of the week previous. Sales of Black Hawk are recorded at 25c., Grass Valley at 21c., and Quartz Hill at 25c. Our quotations in another column give the condition of the market to date.

Petroleum is steady; have no material change to note in any of the Stocks. Home is quoted at from $4 75 to $5 25, and Central at 70c. Below is the latest from the Stock Board:

	Bid.	Asked.
Bennehoff	33	—
Bergen Coal and Oil	40	—
Bliven Oil	35	1 00
Brevoort	1 00	1 20
Buchanan Farm	45	—
Central	62	70
Home Petroleum	4 75	5 25
N. Y. & Alleghany	1 75	—
Northern Light	65	1 00
Pithole Creek	1 35	—
Rathbone	30	—
Rynd Farm	30	—
Second National	—	—
Blood Farm	50	1 10
United Petroleum Farms	22	25
United States	75	—

San Francisco Stock Market.

A telegram from the San Francisco Stock Board, dated May 12, reports Gould & Curry at from $1 42½ to $1 45; Chollar-Potosi 28c.; Kentuck 70c.; Yellow Jacket 44½c.; and Savage 32c.; all of which evince a marked depreciation from our last quotations. Our quotations below exhibit the condition of the market as complete as we can represent it, it being impossible to present a full report of the Stock Board transactions under the present system of transmitting their reports:

SAN FRANCISCO, May 111, 870.

	1st Board.	2d Board.
Savage	32	—
Crown Point	15½	—
Yellow Jacket	44½	—
Kentucky	70	—
Chollar Potosi	—	28
Gould & Curry	1 42½	1 45
Ophir	16	16½
Alpha	—	—
Belcher	25	24½
Imperial	48	—
Hale & Norcross	—	—
Amador	—	—

The Slate Trade.

The Roofing Slate market at the present time is very dull, owing to the stagnation in building. Many quarries have discharged a large portion of their men, while others have stopped work entirely, preferring that course to a further reduction in prices, which are now as low as they possibly can be, without going below the actual cost of manufacture. Below we quote prices of roofing slate in this market. The "variegated" is what was formerly quoted as No. 2.

PRICES OF ROOFING SLATE.

NEW YORK, May 13, 1870.
[Corrected weekly.]
(A "square" represents 100 superficial feet.)

Vermont purple, 1st quality, per square	$9 50@10 50
" green, 1st " "	9 50@10 50
" red, 1st " "	15 00@16 00
" variegated, " "	8 5 @ 9 50
Pa. b'k and d'k blue, 1st qual., "	7 00@ 8 00

Report of amount of Slate shipped over the Lehigh Valley R. R. and Lehigh and Susquehanna R. R..

For week ending May 7, 1870.

LEHIGH VALLEY R. R.

ROOFING SLATE.

Locke Slate Co.	640 squares.
Jones & Williams	520 "
Star Slate Co	200 "
Saylor & Morgan	160 "
Hope Slate Co	120 "
D. Williams & Co.	120 "
Girard Slate Co.	80 "
Blue Mountain Slate Co	40 "
Keystone Slate Co	40 "
Total	1,920 "

SCHOOL SLATES.

D. Williams	73 cases.
Lehigh Slate Co.	16 "
H. W. Harper	40 "
Total	129 "

BLACK BOARDS.

Lehigh Slate Co.	7 cases.

MANTELS.

Lehigh Slate Co.	5 cases.

LEHIGH AND SUSQUEHANNA R. R.

H. W. Harper	105 squares.
J. M. Coffin & Co.	70 "
Thos. W. Parry	70 "
Mauch Chunk Slate Co.	38 "
Thomas Beck & Co.	35 "
Continental Slate Co.	14 "
Total by L. and S. R. R.	332 "
Total by L. V. R. R.	1,920 "
Total for week	2,252 "

The tables of slate shipments which we print above mark our first steps towards presenting to the public complete weekly reports of the trade of both Pennsylvania and Vermont. In compiling these tables, we would be obliged to our correspondents if they would include in each report the amounts previously sent, so that we shall be able to give the grand total to date, as well as the totals for the week. We expect to receive from our correspondent "W.," at Slatington, Pa., in time for our next week's issue, an interesting account of the Twin City Slate Company. This sketch will be followed by others as opportunity may offer. We hope to receive soon from our long time friend "C.," of Buffalo, a communication on the Western State trade. Vermont, we trust, will soon be fully reported in our columns, as we are making efforts in that direction.

It will be noticed by our table that the amount of roofing slate sent to market by the Lehigh Valley R. R., for the week ending May 7, was 1,920 squares, besides 129 cases of school slates. The Lehigh & Susquehanna R. R. transported during the same time 332 squares of roofing slate, making a grand total for the week of 2,252 squares.

Progress of Ocean Telgraphy.

The London *Times*, in an article on Ocean Telegraphy, says it is calculated that on an average a commercial message consists of thirty words. Sixteen words per minute is the rate at which a message can be transmitted and received by skilful operators, so that thirty messages can be sent in an hour. On account of the differences of time between different parts of the earth there can be no division of the twenty-four hours into day and night, and ocean cables must be worked continuously by relays of clerk. Still, in order to allow for the intervals between the conclusion of one message and the commencement of another, the day is considered consist only of twenty hours, in which, therefore, six hundred messages can be sent or received. At the present rate charged across the Atlantic these six hundred messages of thirty words each would bring in a return of £2,700; and thus, allowing three hundred working days in the year, a single cable to America might earn a possible annual revenue of £710,000.

The business done already shows that the commerce between two centres of activity will pay for telegrams at a rate which will not only render the wires very remunerative property, but must also speedily lead to the adoption of such low charges as will enable the system to be employed far more generally than it is at present. Indeed, when the returns from the lines have paid the original cost, and left a reserve fund for repair or replacement, there is no reason why business should not be done at exceedingly low rates, and so as to draw to the cable ordinary messages of domestic news, now consigned to mails only. The entire length of ocean cables laid and in progress, excluding short lines, is twenty thousand nine hundred and sixty-one miles, and the capital stock engaged is $6,925,000.

England is at present dependent on Russia for telegraphic communication with India, and it happens in this wise. Russia constructed a line to her army in the Caucasus. This cost largely for maintenance, and the bright idea occurred that if the line could only be extended to India the expense of its maintenance could be placed upon the broad shoulders of British commerce. The line was then constructed by the English from the termination of the Russian one, by way of Teheran and Tabreez to Bushire, and so through the Persian Gulf to Kurrachee. It was agreed that this line should pay a royalty of forty per cent. on its receipts for the privilege of working through the Russian wires, and the result has been not only the dependence of Angio-Indian telegraphy upon a foreign power, but also that British subjects have paid for the maintenance of the Russian line to the Caucasus, and that the Persian line, thus burdened, has returned to its British proprietors the modest dividend of 1.3 per cent.

Another Russian military line is across Siberia and Tartary, and on to this has been "tailed" a line to Poisietta on the Japanese Sea, whereon a company, "nominally Danish," is to lay a cable to Japan and the Chinese ports. So Russia absolutely contrives to have the English business to China pass over her wires. The London *Times* does not like this, and so urges the completion of ocean lines to take the place of these overland.—*Railroad Gazette.*

Titles to Tin Mines.

A Letter from Commissioner WILSON.

IT being a current report among miners and prospectors that the Government of the United States has a standing reward for the discovery of tin mines, an interested Montana prospector wrote to the delegate of that Territory on the subject. The delegate applied to the Commissioner of the Land Office, who, with that desire to impart useful information with which he meets all inquiries, covers the whole subject in the following letter, which we find published in the Helena *Gazette:*

DEPARTMENT OF THE INTERIOR, GENERAL LAND OFFICE, March 16, 1870.

SIR: I have the honor to state, in reply to your letter of yesterday, inclosing one from Mr. ———, that there is no law within the knowledge of this office authorizing or offering any kind of reward for the discovery of tin; nor is there any law providing for the location of tin mines, nor making any special provision for acquiring title to lands containing tin. Until the discovery of the San Jacinto tin mines, in Southern California, it was not known that any valuable deposits of this metal existed in the United States, west of the old thirteen States, except, perhaps, as to Missouri, and it is owing to that fact, doubtless, that public attention has never been directed to the necessity of providing by statute for the location of such claims. The Mining Act of July 26, 1866, makes provision for acquiring titles to lands containing gold, silver, cinnabar and copper, but no other metals.

The discovery of tin in Southern California is an established fact. Reports of its discovery in one or two localities in Missouri have also reached this office, but the value of these deposits has not been fully developed.

The letter of Mr. —— is herewith returned.

Very respectfully, your obedient servant,

Jos. S. WILSON, Commissioner.

Hon. JAMES M. CAVANAUGH,
House of Representatives.

Coal—Its History, Uses and Distribution.

LECTURE BY PROFESSOR NEWBERRY.

An interesting and instructive lecture on coal was delivered Saturday evening at the Cooper Union by Professor J. S. Newberry, of Columbia College.

The speaker first described the chemical and physical character of coal, and showed its relation to the other members of the series of carbonaceous minerals—the diamond, graphite, lignite, peat, asphalt, petroleum, etc., of which it forms part. The genesis of coal was then described; it was said to be "the tissue of the strange trees which lifted their scaled trunks and waved their feathery foliage over the marshes of the carboniferous continent; its light and heat, the sunshine of long past ages, stored in this black casket, to wait the coming and serve the purpose of man." The plants of the coal period were illustrated by numerous large and effective drawings. The speaker then turned to the economical aspects of the subject, and showed that coal is the mainspring of modern material progress, and the greatest source of national wealth. Of all the nations of Europe, England is the most powerful, because she is the richest. Though occupying a group of islands insignificant in area, she has spread her power over the entire globe, and it is her boast that the sun never sets on her possessions. It is well known to the political economists that the source of England's wealth has been her manufacturing industry; and the mainspring of her industry is her coal. In this respect she enjoys a great pre-eminence over all the nations of continental Europe. The United Kingdoms have a coal area that has been reckoned at 10,000 square miles, while, in round numbers, Belgium has 500, France 2,000, Spain 4,000, and the other nations of Europe still less. The annual coal production of Great Britain is now more than 100,000,000 of tons, and a very short calculation will suffice to show what an immense contribution this makes to her national wealth. The power developed in the combustion of a pound of coal is reckoned by engineers as equal to 1,500,000 foot-pounds. The power exerted by a man of ordinary strength during a day of labor is about the same, so that a pound of coal may be regarded as equivalent to a day's labor of a man. Hence 300 will represent the labor of a man for a year. It has been estimated that 20,000,000 tons of the annual coal product of Great Britain is devoted to the development of motive power, and that this is equivalent to the labor of 133,000,000 of men laboring constantly for her enrichment.

The coal area of the United States is at least twenty times that of Great Britain, or 150,000 square miles of carboniferous coal, and 50,000 square miles of cretaceous and tertiary coals, so that the United States is without a rival in the world so far as regards this source of power and wealth. The distribution of coal in the United States was shown on a map twenty-five by twelve feet, which also exhibited the positions of all the important deposits of iron, and their relation to the fuel.

The deposits of recent coals on the line of the Pacific Railroad, and elsewhere at the West, were referred to, and they were shown to be generally of less value than our Eastern coals, because containing so much more water and oxygen. Many of our lignites are, however, good fuels, and are destined to play an important part in the future history of the great West. The lecturer declared that coal is now considered by all chemists and geologists of any standing as of organic origin, and it may be easily demonstrated that it has been derived from the decomposition of vegetable tissue. As we find it in the earth, it forms one of a series of carbonaceous minerals which represent but different stages in a progressive change from vegetable tissue as found in the living plant. In peat and lignite we witness the first step in the formation of coal. Peat is bituminous vegetation, generally mosses and other herbaceous plants, which, under favorable circumstances, accumulates in marshes, hence called peat-bogs. Lignite is the product of a similar change effected in woody tissue, and because it retains, to a greater or less degree, the form and structure of wood, has received the name it bears. Peat is the product of the present period, and lignites are found in deposits of recent geological age. In the older formations, these carbonaceous accumulations still further changed are bituminous coal. Where special and local causes have operated to carry the change still farther, as where the beds of coal have been involved in the upheaval of mountains, and heat has acted upon it, it is converted into anthracite. When this metamorphosis has been carried still further, the result is plumbago or black lead.

Most of the mineral fuels employed by the civilized nations of the world belong to the class of bituminous coals; but in our country up to the present time by far the largest quantity of coal produced and consumed has been anthracite, because our beds of coal which lie nearest the seaboard and have been longest worked are of this character. These are, however, of the same age with our Ohio coal beds, and the peculiar phase which the coals of Eastern Pennsylvania exhibit is due to the fact that a portion of the great Allegheny coal field was involved in the upheaval of the Allegheny Mountains, and the coal, in common with the associated rocks, was greatly metamorphosed, its gaseous matter being nearly all driven off by the great heat which attended the elevation of the mountains.

The changes which vegetable tissue has suffered in passing through the various stages enumerated, are not only physical, but chemical. The *rationale* of this process may be seen at a glance by reference to the following formulæ taken from Bischoff's Chemical Geology:

	Wood.		Loss.		Peat.
Carbon	49.1	—	21.50	=	27.6
Hydrogen	6.3	—	3.50	=	2.8
Oxygen	44.6	—	29.10	=	15.5
	Wood.		Loss.		Lignite.
Carbon	49.1	—	18.65	=	30.45
Hydrogen	6.3	—	3.25	=	3.05
Oxygen	44.6	—	24.40	=	20.20
	Lignite.		Loss.		Bit. Coal.
Carbon	30.45	—	12.35	=	18.10
Hydrogen	3.05	—	1.85	=	1.20
Oxygen	20.20	—	18.13	=	2.07
	Bit. Coal.		Loss.		Anthracite.
Carbon	18.10	—	3.57	=	14.53
Hydrogen	1.20	—	0.93	=	0.27
Oxygen	2.07	—	1.32	=	0.65
	Anthracite.		Loss.		Plumbago.
Carbon	14.53	—	1.42	=	13.11
Hydrogen	0.27	—	0.14	=	0.13
Oxygen	0.65	—	0.65	=	0.0

From this table, it will be seen that the change from wood-tissue to peat or lignite, and from these to bituminous, thence to anthracite coal and plumbago, consists in the evolution of a portion of the carbon, hydrogen and oxygen, leaving constantly a larger percentage of carbon behind, until ultimately the resulting mineral consists of a portion of the original carbon of the plant with all its earthy matter. That portion of the original substance which is lost in this progressive change, escapes in the form of some hydrocarbon, as water, carburetted hydrogen, carbonic acid, petroleum, etc. The escape of these volatile compounds we see in the gases bubbling up from marshes where vegetable matter is undergoing decomposition; in the gases generated in our coal mines, and, in my judgment, in our oil springs, which always flow from strata charged with bituminous matter. By the application of heat, and with proper management, we can manufacture any of these mineral fuels from vegetable fibre at will. This has been done repeatedly, and although we cannot accurately reproduce the conditions under which these changes are effected in nature's laboratory, we can so closely imitate them as to demonstrate their character.

This lecture was one of the course of free lectures provided for the public by the trustees of the Cooper Union, a course which has continued through most of the lecture season, has been attended by large audiences, and has constituted an important contribution to the public good.

The New York Liberal Club.

Meeting held at the Rooms of the Club, No. 23, Third avenue, May 4, 1870, Mr. Henry Wehle in the chair.

Dr. Adolph Ott read a paper on nutrition, with especial reference to the importance of the phosphates. After giving a definition of the term nutriment, or food, he went on to show that nutriments may be classified into four groups, to wit: 1. Albuminous or plastic substances; 2. Fats; 3. Carbo-hydrates; 4. Inorganic substances; and explained the functions of the elements of each of these groups in detail. According to Moleschott, of whom Dr. Ott is a pupil, the mean daily quantity of food necessary for an adult individual consists of: Albuminous substances, 130 grammes; fatty bodies, 84 grammes; saccharine matter, 404 grammes; inorganic salts, 30 grammes; and water, 2,800 grammes; in all 3,448 grammes. The nutritive quality of any one substance, it was asserted, was entirely relative to the elements of all four groups being equally necessary to supply materials for the continually new manifestations of force. However, in judging of the nutritive value of food, regard must always be had to its digestibility. To quote an instance: oysters contain less nutritive matter than the flesh of fish, yet they are more nutritious. Speaking of the phosphates, the lecturer acquainted the audience with a great number of interesting facts. Among all mineral ingredients, none are more especially attracted and retained by the tissues of the animal body than the phosphoric acid and the phosphates. The higher the organization, the larger the proportion of phosphoric acid and its compounds required. In regard to the brain, it has been found by Bousarelli that among all the organs of the body, it contains by far the largest amount of phosphated fat, the amount of phosphorus being twice as large as that in the muscles. Phosphate of lime is present in every tissue; moreover, all secretions from the blood, which are distinguished by their plasticity, exhibit phosphates; and, according to some investigators, these salts are required to supply the first basis for a new tissue, even in the case of those organs which subsequently exhibit an excess of carbonate of lime.

The second part of the lecture was devoted to the discussion of the question, how the phosphates can be best procured for the system. The great stores of these ingredients are the grains of cereals. They are contained in the so-called gluten-coat, which, like a row of beads, lies between the outer or true brain and the interior mass of starch cells. To illustrate this fact, the lecturer exhibited magnified cross-sections of the wheat-grain or kernel, of commercial bran and of miller's bran. With the present system of grinding, we obtain under the most favorable circumstances only seventy-five per cent. of flour, instead of ninety-four, nineteen per cent., consisting chiefly of gluten and phosphates, being removed by bolting. The objects of this practice are two-fold: first, to separate the ferments lodged in the bran, so that it may be possible to keep the flour for a considerable time without its becoming sour; second, to render it white, so that it will produce bread agreeable to the eye.

Graham bread and "Pumpernickel," or the black bread of Westphalia, are very nutritious, because they contain all the ingredients of the wheat-grain, but they are heavy and sour. In the white descriptions of flour, however, the really nutritious elements are altogether wanting. Yet nine-tenths of all the bread in American cities is made of superfine flour, and a large amount, in addition, is used for cakes, puddings and pastry.

To Professor E. N. Horsford, of Cambridge, the friend and former pupil of Liebig, we are indebted for a method by which the nutrition salts that are lost in bolting are restored to the flour. The same consists in the use of a baking powder, which serves the twofold purpose of leavening the dough, and giving strength to the staff of life. The bread prepared by this method has met with the most favorable reception both in this country and in Europe, where it appears to replace altogether the bread fermented in the ordinary way.

In conclusion, the doctor related his experiences with regard to Horsford's "acid phosphate," which seems to act as if it were nutriment to the cerebral and nervous systems, restoring to their normal action secretory organs that have been deranged, giving vigor where there has been debility, and restored strength where there has been exhaustion.

Dr. Oscar Loew, of the College of the city of New York (to whom we owe the beautiful investigations in the nature of hydrogenium, lately brought before the scientific world), then gave a short account of the manner in which these Horsford powders are prepared. He stated that Baron von Liebig had expressed himself in the most laudatory terms in regard to them. As to the litigation now pending with regard to the matter, he was sorry to see that so many men could be found to testify against the validity of Professor Horsford's patents. If anything was unjust, this was unjust.

Professor T. S. Lambert informed the Club that he pointed to the great importance of phosphatic food as early as 1842 or 1843. He advocated at the time, in the *Merchants' Magazine*, the idea that the brain was the garden-soil, more or less productive, according as it was enriched or exhausted in its proper supply of material, especially of a phosphatic character. No great credit, however, he thought, could be assumed for being the first to think, or rather to express, these eminent truths, since, after the demonstrations of Liebig, it was a necessary step to think of the rest that we daily now perceive, or clearly understand. All honor to Liebig, who impregnated all minds with the germs of these truths.

The discussion closed at eleven o'clock, after which the Secretary of the Club, Mr. D. T. Gardner, announced that at the next meeting a paper would be read by Mr. Boucher on the Science of Money.

Dr. Van Der Weyde said that inorganic materials can be assimilated by the animal body as well as organic, and adduced, in support of this statement, numerous examples, such as the absorption of iron and other mineral constituents of chalybeate waters, the familiar use of common salt, which is inorganic, and the reception of various mineral medicines or poisons into the system. It is shown by Boussingault that the great part of the lime in our bodies is due to the water we drink, and hence must have been absorbed in an inorganic form.

The New Mines in Arizona and New Mexico.

Ex-Governor McCormick, of Arizona, present Representative in Congress from that Territory, is now at the Astor House. He has late advices from the newly-discovered silver lodes on the thirty-second parallel, and upon the borders of Arizona and New Mexico. The sheriff of Pima county writes from Tucson, the capital of Arizona, one hundred and fifty miles west of these ledges: "Everybody who has been there says that the veins beat anything previously seen or heard of on the American continent. You may form some idea of it, when I tell you that there are innumerable veins of ore cropping out boldly, and perfectly perpendicular, forty and fifty feet in places, and from thirty to sixty feet wide. Every one says that there is ore enough in sight to give employment to ten thousand miners. I have seen a great many pieces of the ore, and it all looks well for surface rock. There is no doubt but there will be a tremendous emigration from California and the East immediately. They are already beginning to flock in from the Rio Grande. More than thirty-five thousand feet of claims are taken up already."

The latest number of the *Arizonian*, published at Tucson, says: "Tidings received last Wednesday from the prospecting party who left this place some twelve days previously, prove that the reports of the San Francisco papers, so far from exaggerating, have failed to convey an adequate idea of the extent and richness of this deposit. From observations made by the party mentioned, it would appear that it is not an ordinary lode, but a mountain of quartz, the base of which covers an area of somewhat more than four hundred thousand square yards, and the height of which is not less than one thousand feet. From the base of the mountain 'spurs' shoot forth in almost every direction, some of which have been traced to a very considerable distance. By the simplest process of assaying, the 'croppings' have yielded as high as two hundred dollars to the ton, while fragments from the main body of the rock have yielded as high as two thousand three hundred dollars to the ton."

The following is an extract from a letter to Mr. Hodges, written by one of the party: "We have reached the mine, and hopeful though we were at starting out, yet we were not prepared to witness anything so infinitely beyond our expectations. Here, above ground, lies sufficient quartz to keep a score of mills in constant operation for a whole lifetime."

The nearest route to these remarkable discoveries, from the East, is via the Kansas Pacific railroad and stages down the Rio Grande to Mesilla; thence across the third parallel. The veins are within four miles of the proposed line of the Southern Pacific railroad, and one hundred and fifty miles west of the Rio Grande. Stages go directly to them, but the route from the Rio Grande west is dangerous, owing to the hostility of the Apaches.

Rich Quartz In El Dorado.

The Placerville *Democrat* of April 16 reports a good strike on Quartz Hill, by Mr. Fink and Hodge & Co. Mr. Fink struck his first prospect about the 25th of February last—not three months ago—and working alone most of the time, he has taken out, according to his own statement, $3,000. This amount has been taken from a hole sunk upon the ledge not deeper than eight or ten feet, nor more than twenty feet in length. Hodge & Co., whose claim is north of this, have taken out as much as $100 to the pan.

THE ENGINEERING AND MINING JOURNAL.

CONTENTS FOR THIS WEEK.

[*Illustrated Articles are marked with an asterisk.*]

*Howland's Patent Rotary Pulverizing and Amalgamating Quartz Mill..... 305
Sulphur in the West Indies..... 305
Quantative Estimation of the Carbon in Pig-Iron..... 305
The Coal Drawback Suit..... 306
The Discovery of Springs,..... 306
Report of the Hon. John Jay Knox, Deputy Comptroller of the Currency..... 307
Polytechnic Club of the American Institute 308
MINING SUMMARY..... 309
BUSINESS AND PERSONAL..... 309
MARKET REVIEW..... 310
THE SLATE TRADE..... 311
Mining Companies and Stock Quotations..... 315
Coal—Its History, Uses and Distribution..... 312
The New York Liberal Club..... 312
The New Mines in Arizona and New Mexico..... 312
Rich Quartz in El Dorado..... 312
EDITORIALS:
Prof. Whitney and the Table Mountain Beds..... 313
More Bones..... 313
The Mineral Resources of Texas 313
Slate Trade Reports..... 313
Indian Outrages in Arizona... 313
Steam on the Canals..... 313
On the Manufacture of Vitriols.. 314
Sinking the Caisson..... 314
New Oscillating Grate with Steps 314
Locomotive Designs..... 314
Progress of Ocean Telegraphy.. 311
Titles for Tin Mines..... 311
An Exhibition Company..... 315
ADVERTISEMENTS..... 315

ROSSITER W. RAYMOND, Ph. D., Editor,

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.*

SUBSCRIPTION—**$4** *per annum in advance;* **$2 25** *or Six Months.*

ADVERTISEMENTS.—*The rates are as follows: Inside pages,* **25** *cents per line each insertion; the outside or last page,* **40** *cents per line. Payment required in advance.*

NEWS-DEALERS *will be supplied through the agency of the* AMERICAN NEWS COMPANY, *No.* 121 *Nassau street, New York City.*

COMMUNICATIONS *of all kinds should be addressed to the Publishers. The safest method of transmitting moneys is by checks, or Post-office orders, made payable to their order.*

Correspondence and general communications of a character suited to the objects of THE ENGINEERING AND MINING JOURNAL *will always be welcome.*

The Postage on THE ENGINEERING AND MINING JOURNAL *is twelve cents a year, payable quarterly, in advance, at the office where received.*

GEO. E CUMMINGS *is our Agent at Philadelphia. Office,* 429 *Chestnut street.*

WESTERN & COMPANY,
Publishers and Proprietors,
37 PARK ROW,
NEW YORK CITY.

P. O. Box, 5969.

Professor Whitney and the Table Mountain Beds.

THE distinguished chief of the geological survey of California, in a recent letter to the editor of this journal, corrects an error concerning the bearing of his imperfectly reported remarks at the Chicago meeting of the American Association, upon the subject of the age of the sedimentary beds of Table Mountain. From his present authoritative statement, we are enabled to give the substance of his communication to the association.

He presented a full account of the discoveries of his corps of both plants and animal remains in the superficial deposits, as well as in the cement, pipe-clay, gravel, etc., underlying the basaltic lava at Table Mountain and elsewhere, but carefully abstained from drawing positive conclusions, declaring and lamenting the fragmentary nature of the knowledge thus far obtained, explaining the difficulties which attend the acquirement of information concerning these formations, and expressing the hope that more definite results would be achieved.

He mentioned the fact that the mammalian remains up to that time identified as positively underlying the basaltic lava, (and therefore older than the lava-flow of Table Mountain) bear a closer relation to those of the rocks heretofore classed as Miocene by LEIDY and HAYDEN, than to the Pliocene of these geologists; while on the other hand, Professor NEWBERRY had pronounced the same rocks, after an examination of some plants sent him by Professor WHITNEY, to be probably Pliocene. He particularly insisted upon the fact that all the animals and plants found under Table Mountain were of extinct species, using this circumstance, as well as that of the enormous denudation in the region in question, as evidence of the great antiquity of the strata, without attempting to give any positive statement as to their being synchronous or not synchronous with any portion of our Miocene or Pliocene marine formations.

We are glad to learn, moreover, that a party has already commenced work in the region of ancient river-channels, with the intention of investigating it thoroughly, and another party has started for the country east of Owen's lake, in the Coso and Ingo mountains. The topographical and geological work of the survey will now be pushed with vigor; and the publication of the zoological and botanical volumes may soon be expected.

Professor WHITNEY writes: "I may add, that the evidence of the vast antiquity of the human race in California is gradually accumulating, and that there is not the slightest reason for supposing the 'Calaveras skull' to be a hoax, or for classing it with the famous 'Cardiff giant.' You may confidently look forward to an interesting chapter on the subject of the antiquity of man in the next volume of the 'Geology of California.'" We had received in some way the impression that the celebrated skull was quite discredited as a piece of geological evidence, not by the ridicule of the wits, nor, perhaps, by the modern maggot found in its ancient cavity, but by a confession of the parties who professed to have discovered it, that they themselves had concocted the story, or put the relic where it was found. No positive proof of such a confession has come to our attention; but it has been several times alluded to in our hearing. We have no desire (beyond the innocent malice of all men, and especially editors) to see Professor WHITNEY's skull demolished. But probably he would himself admit that a discovery upon which such vast conclusions are to be predicated must be beyond suspicion. On the other hand, if other evidence is gradually accumulating to the same effect, it must become gradually more and more likely that the Calaveras skull is genuine, and less and less important whether it is so or not. The only way to make its testimony satisfactory is to make it unnecessary.

More Bones!

VISITORS to the Cologne Cathedral will doubtless remember the guide, whose laconic remark, as he points out one stack after another of the remains of the eleven thousand virgins, is only and evermore, "More bones!" It is with something of the same brief iteration that we introduce to our readers a new specimen, to be added to the collection of scientific, fossiliferous or sepulchral verses which have been embalmed, petrified or otherwise preserved in our columns. This one is called—

TIME AND MAN—A MINING PARTNERSHIP.

BY THE AUTHOR OF "JIM GREEN."

Marm Nature, quite ill-naturedly,
Contrived to hide her store
Of precious metals in a mass
Of most unprecious ore—
A little treasure, sprinkled through
A ton of trash or more.

And fearing still, lest patient toil
The noble prize might get,
She went to work most miserly
To make it harder yet,
And stirred the whole into a mess
Of nasty sulphuret.

Some million years she cooked and skimmed
In this ingenious way;
And when at last the thing was done,
You might have heard her say,
"My treasures cannot possibly
Become the spoiler's prey!"

But Time himself turned traitorous,
And secretly began
The mixture to disintegrate
Which he had helped her plan,
And, following close upon his heels,
Came that smart creature, Man.

While Time and Man worked hand in hand,
There was no sort of trouble;
Man reaped the golden harvest, and
Time toted off the stubble;
But by and by, impatient Man
The work was fain to double.

Quoth Man, "There's treasure down below,
Far more than here atop."
Quoth Time. "I'll bring it up to you,
With my next eon's crop."
Quoth Man, "To wait your lazy limbs
I can't afford to stop:

"While you are slowly scraping down,
I'll dig myself a shaft,
And what you wrought in countless years
I'll do with speedier craft—"
At which that venerable dunce
Incredulously laughed.

But presently was heard a sound
Beneath the rocky ledges,
As if the days had come again,
When through the broken edges
Of fissures in the primal crust
The earthquakes drove their wedges.

"Ah, ha!" cried Time, "my youth returns
As in the stormy past;
We'll tilt these recent sediments,
As we upturned the last!"
"Be quiet, you old fool;" said Man,
"That's nothing but a blast."

"Ah, ha!" cried Time, "I smell a smell
More pungent than a Geyser;
The sulphurous era comes again!"
But Man replied, "You lie, sir;
What titillates your ancient nose
Is my desulphurizer."

"But look!" returned astounded Time,
Unmindful of these railings,
"Post-tertiary beds apace
Behind yon garden palings
Accumulate!" Man scornfully
Replied, "My heaps of tailings!"

Then Time, whose blood began to flush
His epidermis yellow,
Cried out, "My occupation's gone!"
(He stole that from Othello)
And looked about him for revenge,
Like any younger fellow.

He made the debts fall promptly due,
Ere bullion did appear;
He levied on the capital stock
Assessments every year;
He froze the hapless holders out,
By making roasting dear.

He set the titles by the years,
According to their ages,
(Not on his scale of periods,
But the Recorder's pages)
And as the dividends declined,
He raised the rate of wages!

Until subdued, repentant Man
Was fain at last to say,
"In spite of human hope and skill,
The truth remains alway,
That every mining enterprise
Takes time to make it pay!" R. W. R.

The Mineral Resources of Texas.

PROFESSOR ROESSLER, the accomplished geologist of the General Land Office at Washington, is now making some explorations in Texas. We learn from an exchange published in that State that he intends to examine especially the great copper region of the north-west, in Wichita, Archer, Young and other counties. He speaks in the strongest terms of the copper of Texas, and says it is more valuable than even that of the celebrated mines on Lake Superior. The Professor thinks it quite likely, too, that he will make important discoveries of silver and gold in the north-west, as he has received specimens of both from that part of the State, and speaks especially of very interesting samples of gold lately sent to Washington from San Saba county. His department has lately received some of the finest varieties of opal from the same county, and from the same region some very remarkable specimens of granite, of the red syenite variety, resembling the red granite of Syene, in upper Egypt, and the beautiful rock from Peterhead, Scotland, now much in use for monuments and tombs, and which receives a polish equal to agate and cornelian.

Professor ROESSLER was connected with the partial geological surveys of the State made before the war, and entertains a very high opinion of the mineral wealth of Texas.

Slate Trade Reports.

WE intend from the present time to give our readers regular weekly reports of the Slate Trade, together with a statement of the number of squares and cases shipped from various points. Our tables, at the present time, are of course incomplete; but we hope, through the kindness of those interested in this matter, to make them full, and hence more valuable. We would call attention to the fact that we were the pioneers in this feature, and though for a time we were obliged to abandon it, we now propose to make our JOURNAL the organ of the slate interest of the country, giving each section its full share of attention, hoping thereby to advance the interests of this new industry, and place it upon an equal footing with other trades of like importance.

Indian Outrages in Arizona.

WE would, in a most respectful way, call the attention of the authorities at Washington to the reports of Indian outrages in Arizona, of which we give accounts this week in our mining summary. These attacks upon miners are becoming more and more frequent, and are seriously interfering with the development of that portion of the country. We cannot but think, in the light of these atrocities, that the hard-fisted course pursued by General Sheridan is the only one that will ever protect the lives and property of our brave frontiersmen. His chastisement was certainly severe, but will prove to be the most merciful to both the Indian and the pioneer.

Steam on the Canals.

MR. J. J. ILLINGWORTH, gives in the Utica, N. Y., *Manufacturers' and Lumberman's Journal* the following very interesting condensed *resumé* of the various plans that have been tried for successfully employing steam on canals, and between the merits and demerits on economical grounds. He says: "As the subject of 'Steam on the Canals' is now agitating the public mind, and the State Legislature talk of giving $100,000 for the best plan for propelling boats by steam, etc., etc., it may not be amiss to take a retrospective glance at what has been done with steam on canals. The first we have any knowledge of was a small paddle wheeler, having two paddle wheels at the stern, with the cranks between the wheels. It was built for the Forth and Clyde canal, Scotland, in 1802, by Lymington, but seemed to be short-lived for either a passenger or freight boat, but suited admirably for an ice-breaker, for which purpose it was mostly used. The next we have any knowledge of was the 'Cyclops,' a stern-wheeler, built in 1828 as a passenger boat. She was 64 feet long, 16 feet wide, and 6 feet deep, and carried about 40 tons, and ran about 3½ miles per hour in the canal and about 6 miles per hour on the river Firth or Forth, also in Scotland. This boat ran for a long time, giving good satisfaction. The 'Manchester' was built in 1831, with one stern wheel, and carried from fifty to sixty tons of freight, and steamed 3½ miles on the canal, and 7 miles on the river. The 'Lord Dundas' was also built in 1831 as a passenger boat, with two paddle wheels, one on each side of the stern, and steamed 7½ miles an hour on the canals. This last seems to be the best results obtained. But the cost was far greater than horses, and the trouble they had with the engines seems to have discouraged them. This may have been on account of putting in too small engines and boilers for the work they had to do. The first attempt to use the screw on the canals was in or about 1838, between London and Manchester, England; but there being so many locks (about one in every mile), and want of depth of water, and the narrowness of the canal, the experiment did not lead to any practical results. But in 1854 the screw was again tried on the Aire and Calder navigation and Leeds and Liverpool canal, and with very good results up to the present time; in fact, giving entire satisfaction on a canal 50 feet wide at water level, and 35 feet at the bottom, and 6 feet depth of water. About this time an endless chain was laid at the bottom of the canal, worked by a steam engine on land, and attached to the boat by means of a pulley. This was found to be too cumbersome and too expensive, and was abandoned very soon after a fair trial. Rails were also laid on the banks of the canal, and a locomotive was used to 'tow' instead of the horse. But this plan failed entirely, being too expensive. One idea was to place a number of floats on an endless chain running alongside of the boat, and driven by an engine on board the boat. A single glance at this mode will show too much friction to be overcome by the 'drag' of the floats. Another plan was to construct the boat like a center 'board boat,' and place a wheel

in place of the center board, the wheel running on the bottom of the canal, and propelled by an engine on board. But this plan failed with the others. Many plans were tried in England and Scotland, with varying results, until about 12 to 15 years ago, when the results seem to have given good satisfaction, and from the fact of their being still in use, we may fairly presume that they are cheaper than horse-flesh."

I will try and describe one of the most successful of these "canal boats" driven by steam. It may be of some interest to those who may contemplate experiments with a view of getting the Legislative $100,000. The lighter "Thomas" may be taken as a sample, and was of the following dimensions: 66 feet long, 16½ feet broad, and drawing 6½ feet of water, and carried from 70 to 80 tons cargo. The boiler was upright, tubular, 3 feet diameter, and swelled to 3 feet 5 inches above the water line, 7 feet 3 inches from grate bars to crown, 54 brass tubes, averaging 3 feet 5 inches long, the tubes tapered from 2¼ inches to 1¾ inches. The fire-box was 2 feet 6 inches by 1 foot 6 inches, giving a surface of 11 feet 78-100; the tube plate contained 2 54-100 feet, making the heating surface of the fire-box 14 32-100 feet; and with 54 tubes, averaging 2 inches in diameter, and 3 feet 5 inches long, gives 96 60-100 feet, making a total heating surface of 110 92-100 feet. The cylinders were two, 6¼ inches in diameter, and 10 inches stroke, worked by a link motion with an extreme travel of valve of 3 inches. The diameter of screw was 3 feet 6 inches, and the pitch 4 feet. This, with 130 revolutions, gave a speed of five miles per hour; but by the number of revolutions, and the pitch of the screw, we find that she lost twelve per cent. of her power by slip, for the actual number of revolutions of the engine and pitch of screw without slip would be 909-1000 miles, or very near six miles per hour. This is considered very good, as ocean steamers, with all their body of water, slip ten or more per cent., and in a canal, where there is no such density of water, twelve per cent. may be considered very remarkable. Considering the small size of cylinders, and the low pressure, only thirty-five pounds in the cylinder, these results may be considered as about the best obtained in canal navigation. In regard to the cost, and the saving by steam over horse-flesh, I have no means of comparing, for our monetary system has undergone many changes since then; but I will give you the English estimate of it, and those who would like to do so can make the comparison. On the English canals the captain or master gets about £1 1s. per week, and makes two trips per week with horse-flesh, the same price being paid for captain on the steamer making three trips. The cost of the boat, and the expense of running both, will be seen by the following table of statements:

	£	s.	d.
Captain or Master's wages	1	1	0
Mate's wages	0	18	0
One man and horse	1	8	0
Two lines, etc	0	2	0
Interest at 7½ per cent. on cost of boat, £450 per week	1	1	7½
Total per week	£4	10	7½

or 3-10 of a penny per ton per mile.

For the steamer, as follows:

	£	s.	d.
Captain or Master's wages	1	1	0
Mate's wages	0	18	0
Engine driver	1	0	0
Oil, tallow and packing	0	3	8
15¾ cwts of coal	0	5	6¼
Interest at 7½ per cent. on cost of boat and engines and boiler at £770	1	17	0½
Total per week	£5	5	2½

or 23-100 of a penny per ton per mile. It will readily be seen that the steamer is nearly one-third cheaper. The only drawback in the case of steam is its first cost. The engines and boiler should take up the least possible room, and be strongly made. Towing boats on the canal with a steamer will hardly pay, on account of the difficulties in steering, and the detention at the locks by one boat waiting for the others to pass.

On the Manufacture of Vitriols.

BY A. EILERS, MINING ENGINEER.

III.

BLUE VITRIOL.

BLUE or copper vitriol is the crystallized sulphate of copper, (Cu O. SO_3 +5 HO) and contains, when pure, 31.85 oxide of copper (25.4 copper) 32.07 sulphuric acid, and 36.08 water.

Formerly the so-called mixed vitriols, (Salzburg, Cyprian, Eagle vitriols, etc.) containing a greatly varying percentage of copper, and a greater or less admixture of the sulphates of zinc, iron, etc., were extensively manufactured in connection with the mining of poor copper ores. They were then much used in the arts and manufactures; but as a certain percentage of copper in the vitriol is often required, most establishments prefer at present to buy the pure vitriols, and prepare their mixtures themselves. For this reason the production of mixed vitriols has fallen off considerably, and the manufacture of the pure article has increased in all parts of the world. In this country the manufacture of copper vitriol, as a regular business, is comparatively recent, and has assumed its greatest proportions since last year, when Congress imposed an exceedingly heavy tariff on the imported article. We do not propose to go into details in regard to all the different methods proposed and carried out in divers parts of the world, as the number of these processes is altogether too large to permit discussion in the columns of this paper. We intend to describe only the methods best suited to the circumstances surrounding any manufacture in this country, i. e. such as are simplest in execution and the cheapest. The consumption of blue vitriol in this country is at present very large, and is steadily increasing. It is used principally in dyeing and printing; for the manufacture of green and blue colors; in telegraphy; for the conservation of grain, wood and skins. Of less importance is its use in galvanoplastic; as a medicine; in laboratories; for the preparation of absolute alcohol; for the manufacture of the so-called copper-soap, (the green precipitate resulting from the mixture of a solution of sulphate of copper with a soap-solution, and used as an oil-color) and for the bronzing of plaster statues.

It is manufactured in its purest state from metallic copper and sulphuric acid, the acid being used in some establishments concentrated, in others diluted with water. In the former process much residuum of a mixture of sulphide of copper and oxide of copper is formed during the dissolving process and this is lost for the final product of the particular campaign in which it is produced, while at the same time considerable sulphuric acid is lost as sulphurous acid; the latter, or diluted acid process, is therefore the cheaper of the two, and especially appropriate in connection with sulphuric acid works, where the chamber-acid from the first chamber can be directly used. The manner of proceeding is the following:

The copper is thrown into the dissolving vessels in the shape of granules, chips, in short, in as small pieces as possible, and in such quantity as to fill a little over half of the tubs. Sprinkled with hot diluted sulphuric acid under access of the air, the metal will dissolve, and sulphate of copper will be formed. The heating of the acid is effected by steam in wooden, lead-lined vessels, and from these the acid is conducted over the copper by means of pipes and rose-heads in thin streams. The dissolving vessels have double bottoms, the upper one being perforated. The acid, percolating through the copper, dissolves it, a very concentrated solution is formed—in fact, so concentrated that, in the troughs below the vessels, crystals of vitriol are deposited along the bottom as soon as the lye begins to cool. The acid mother-liquor runs into a vessel at the end of the troughs, from which it is raised by steam, pressing on top of the liquid, or by other convenient contrivances, into the vessel above, holding the hot sulphuric acid. It is then used over again for dissolving new quantities of copper. The crystals are taken out of the troughs and deposited on platforms in front of the troughs, and inclined towards them. Here they are washed with cold water, in order to remove the adhering acid mother-liquor, then transferred to wooden lead-lined vessels, where they are dissolved in hot water, of which as little as possible is used, in order to produce a concentrated solution, out of which the vitriol will quickly crystallize. The liquid, after standing for some time, is drawn off by means of syphons from the residuum, (which is always present in small quantity), and conducted into crystallization-vats of square form. Strips of lead hang down into these vats from sticks laid across their top; and on these are deposited the largest and most beautiful crystals. The crystals are the larger the greater the surface of the vitriol solution exposed. Around the leaden sides and the bottom of the vats is collected a dense mass of smaller crystals, which in many establishments form an article of secondary value, and one kept separate, not on account of their constituents, but simply because their appearance is not so inviting. In other works, the smaller crystals are dissolved again and recrystallized. In most factories, however, all the vitriol formed is taken out after a fortnight, spread on inclined platforms and washed; or else this operation is performed in baskets, perforated boxes, and the like, which are moved to and fro in vats containing cold water. The mother-liquor and wash-water are both conducted into vessels, from which they are raised into the hot-water tank above, to be used again for dissolving vitriol. The washed article is thrown upon broad, inclined platforms, in order to let the water run off, and is then dried on drying scaffolds by artificial heat. It is packed in wooden barrels, and can thus be shipped without danger of injury.

In our next, we shall speak of the manufacture of sulphate of copper from sulphurets of copper, both the natural and the artificially prepared.

Sinking the Caisson.

THE first step of progress in the actual building of the East River Bridge may be said to have been taken upon the occasion of the caisson, which goes to form the foundation for the stone pier of the bridge upon the Brooklyn side, being placed in position, and lowered into its final resting-place. The caisson, which has lain at Greenpoint since its launch, was towed on Monday to Dock street, and arrived at the pier one block above Fulton Ferry at 10 o'clock yesterday morning. It was brought down by the steamers Virginia Seymour, T. E. Babcock, Schultz, Titan, N. B. Starbuck, and Seth Low, all being 280 horse power. An immense crowd of spectators had gathered to see the arrival of the monster caisson at its final destination. There were a number of distinguished visitors, who remained upon the monster while it was being placed in position. Among these were Captain John Maginn, the veteran Sandy Hook pilot, who piloted the caisson down the river; Messrs. William C. Kingsley, Superintendent of Construction; Colonel W. A. Roebling, Engineer-in-Chief; Horatio Allen, Consulting Engineer; Hon. Henry C. Murphy, Hon. J. S. T. Stranahan, John H. Prentice, C. C. Martin, Assistant Engineer; Colonel Paine, Assistant Engineer and Constructor; Dr. S. Rule, Inspector; Mr. Bell, of the firm of William H. Webb and Bell; T. C. Douglass, Master Mason; Daniel Hart, Harbor Master; and other well-known citizens.

The difficulty of getting the caisson into position proved to be not so great as was anticipated. Everything moved along smoothly, and the arduous undertaking of placing it in the final position was effected without the slightest confusion or damage. The work was done under the general supervision of Henry C. Murphy, President of the East River Bridge Company, and John A. Roebling, Chief Engineer of the same. By half-past eleven o'clock nothing more remained to be done. The caisson is one hundred and seventy feet long, one hundred and two feet wide, and eighteen feet deep. The material of which it is made is yellow pine, filled in with concrete, one floor rising above the other. Its weight is two thousand eight hundred tons, and, taking into consideration that over three million five hundred thousand feet of oak and pine lumber were used in its construction, it may be very correctly described as a huge, oblong mass of timber. Ten feet more of timber are to be laid on top, after which the mason work will be begun. In the meantime, iron pipes with ladders inside will be sunk, which will enable men, by the aid of an air pump, to descend and dig. As fast as the mason work is laid, the caisson will sink until it is completely imbedded in the earth, where it will probably remain for centuries. Building operations will soon be commenced. There will be three gangs of one hundred and seventy-five men each employed to go down the pipes. They will excavate within the caisson until it is by this process sunk from thirty to fifty feet deeper than at present. Everything connected with the building of the bridge will now be pushed forward rapidly.—*New York Star.*

New Oscillating Grate with Steps.

A NEW form of oscillating grate is described in a late number of *La Houille*, as follows: "Since the beginning of this century the construction of grates for furnaces has been the subject of very remarkable experiments, and inventors have incessantly proposed new forms or modified old arrangements. Some have devoted themselves more particularly to the study and improvement of the grate-bars. Thus we have seen the hollow, the movable, the skeleton, the oscillating bars, come into use. Others, on the contrary, have applied themselves to the form or mechanism of the grate itself, and have invented movable grates, grates with oscillating bars, turnable grates, endless grates, and many others. But the form which has most attracted the attention of engineers and manufacturers is that with steps, which, it is asserted, will burn the smoke completely. We shall describe an oscillating grate with steps, recently invented by Mr. T. WRIGLEY, which burns the smoke, and may be applied to all kinds of boilers and various other purposes. In this system the furnace consists of a hopper, and the greater or smaller supply of fuel is regulated by a door placed between the hopper and the brick vault. Under this hopper is placed the plate of the fire-box, to which grates are attached, the front end of which rests on other grate-bars, which again are lying on a third grate. These grates receive a slow to and fro motion by means of a belt and pulley with a proper mechanism. A little water-trough is intended to protect the supports of the grates from the intensity of the heat, and to prevent their being burnt in a short time. The fire-bridge is placed at a certain distance from this water-trough, under which is a kip-door, to close the space under the grates. This door is opened from time to time, to remove the cinders and ashes which accumulate between the trough and the fire-bridge. The speed with which an alternative motion is communicated to the grates changes with the nature or quality of the coal, and with the pressure of the steam to be generated. But in all cases, since the coal is pushed forward gradually, it is evident, according to the inventor, that the inflammable gases which are given off from fresh fuel have to pass the entire surface of the glowing coal, and consequently are inflamed and burnt before leaving the flue under the boiler: that is to say, the fuel is consumed in the most profitable manner, and complete absence of smoke is secured. The furnaces constructed upon this principle, and for some time in operation at the mine of Messrs. FIELDEN BROTHERS, at Robinwood mill, near Todmorden, have given very satisfactory results. It is asserted that they have generated more steam with the same amount of fuel than any other known furnace. Besides, the work of the fireman is very much reduced, because he has nothing to do but to keep his hopper well filled with fuel, without having to pay any attention to the burning of the smoke.

Locomotive Designs.

WE notice, says *Engineering*, that the Directors of the Rhenish Railway Company have opened a competition for designs for heavy-goods locomotives. The conditions of this competition, which will, no doubt, interest many of our readers, are as follows:

CONDITIONS.

I. There are to be employed four-wheeled locomotives, with separate tenders.

II. The effort of the pistons must be transmitted to the driving axles by means of a well-constructed transmission.

III. Some means are to be devised by which the tender wheels can also be made available for adhesion.

IV. When utilizing the weight of the tender for adhesion, the engine must be able to take twenty wagons, of ten tons each, up an incline of 1 in 70, at seven miles per hour (11¼ kilometres).

V. The engine must be fitted with an apparatus to prevent an excess of speed over the maximum velocity.

VI. The engine is to be fitted with LE CHATELIER'S steam-brake, or with any other counter-pressure steam-brake.

VII. The greatest possible simplicity and solidity of construction are essential conditions. The form of boiler is at discretion.

VIII. Detailed drawings, with dimensions and descriptions relating to the construction, and notifying the adoption of particular arrangements, may be sent in up to July 1, 1870.

IX. The judges will be the resident engineer of the Rhenish railways, the locomotive superintendent of the Rhenish railways, and three engineers who are actually, or have been, locomotive superintendents of railways.

X. The rewards have been fixed as follows:

(*a*) First prize	$1,000
(*b*) Second prize	500
(*c*) Third prize	250

The competitive designs must be accompanied by the name of the author or by a motto.

MINING COMPANIES AND STOCK QUOTATIONS.

GOLD AND SILVER COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Alameda Silver		A. Queran, 108 Wall st.	$2,000,000	$10 00		
Ada Elmore	South Boise, Idaho					
American Flag	Nevada District, Col.	P. P. Fullerton, 71 B'way.	600,000	10 00		
Atlantic and Pacific	Humboldt Co., Nevada.					
Bates and Baxter	Colorado			50 00		
Benton	Colorado	W. F. Drake, 15 Broad	500,000	5 00		10
Briggs	Colorado	J. P. Davies, 19 Cliff	1,000,000	100 00		
Black Hawk	Colorado	C.T.Whittington, 48 Broad.	2,500,000	100 00	25	26
Bobtail	Colorado	J. Stanton, Jr., 25 Nassau.	1,000,000			
Bullion Consolid'ed Gold	Colorado					
Burroughs Gold	Colorado					
Central Gold					20	23
Consolidated Gregory	Colorado				1 65	1 70
Combination Silver	Nevada			100 00		
Columbia Silver	Austin, Nevada	J. M. Brown, 155 B'way	5,000,000			
Commercial Silver		J. E. Smith, 26 Pine	3,000,000			
Corydon	Gilpin Co., Colorado.	J. Samuels, 40 B'way	500,000			
Downieville	Colorado		2,500,000	25 00		
Eagle Gold	Gold Dirt Dist., Col.	J. P. Davies, 19 Cliff	300,000	1 00		
Empire Gold and Silver	BodieBluff,MonoCo.Cal	H. K. Gates, 70 B'way	1,000,000			
Edgehill		A. Fullerton, 71 B'way	10,000,000			
Esperanza Silver		Ezra Clark, Jr., 13 William.	400,000			
Fisk Gold		H. Johnson, 135 Fulton	500,000			
Forest Queen		E. B. Beet, 62 B'way	1,000,000			
Golconda Gold	Sherbrooke, C. E.	H. Adams, 71 Broadway	2,000,000			
Gunnell Gold	Colorado	J. H. Rolston, 80 B'way	1,000,000	50 00		
Gunnell Central	Colorado	C. B. Bostwick, 16 B'way.	3,000,000	10 00		
Gold Rock		R. M. Lockwood, 93 Wall.	400,000			
Grass Valley					21	22
International Silver		J. W. Brazier, 26 Pine	600,000			
Hope Gold	Colorado		5,000,000			
Holman			2,000,000	25 00		
Kipp & Buell	Colorado		300,000			
Knickerbocker Gold		J. H. Rolston, 80 B'way	200,000	100 00		
La Crosse Gold	Nevada Dist., Col.	P. P. Fullerton. 71 B'way.	1,000,000		8	12
Lander Hill T. & S.	Nevada	M.L.Catherwood,74 B'way.	1,000,000			
Lewis Gold	Georgia		1,000,000			
Liberty Gold					01	02
Manhattan Silver	Nevada	M. L. Ogden	400,000			
Maraposa common	California	Jas. H. Ferdon, 34 Wall	12,000,000		8½	9¼
Mariposa preferred	California	do. do.				
Montana Gold		G. De Cordova	400,000			
Montana M. L. & M. Co.	Montana	A. M. Hoyt, 22 William	250,000			
Montrose	Clear Creek Co., Cal.	W. W. Perkins, 71 B'way	1,000,000			
New York Silver	Nevada	Thos. Sproull, 78 B'way	1,500,000			
New York and Austin	Nevada	E. R. Siccomb, 70 Wall	500,000			
New York and Owyhee	Owyhee Co., Idaho		1,000,000			
New York and Eldorado		G. H. Munroe. 10 Wall	2,000,000			
N. Y. & Montana M. & D.	Montana	F. A. Chapman. 20 Nassau.	1,250,000			
N. Y. & Silver Peach	Nevada	R. C. Root, 74 B'way	2,000,000			
N. Y. & Utah P. & M.		W. H. Mailler, 108 Wall				
Nye						
Ophir Gold	Comstock Lode, Nev.	L. C. Warner, 70 B'way	625,000			21
Owyhee Gold		W. H. Smith. 43 Ex. Place.	1,700,000			
Pahranagat Central	Nevada	J. E. Smith, 25 Pine	6,000,000			
Quartz Hill Gold		F. Bernard	2,500,000		25	26
Reese River Consol'd	Nevada	W. B. Ogden	6,000,000			
Rocky Mountain	Colorado	S. M. Pond, 70 B'way	500,000	10 00		5
Rollins Gold		Thos. Bond, 132 B'way	600,000			
Sensenderfer	Colorado	H. A. Shewill, 19 Broad	1,000,000		1 00	
Silver Bend		F. W. Macy, 20 Nassau	1,500,000			
Silver Mt. Silver		H. A. Moen, 71 B'way	1,000,000			
Silver Peak & R. M.	Nevada	W. B. Ogden, 52 Wall	5,000,000			
Smith & Parmelee	Colorado	W. H. Hollister, 6 Broad	2,500,000	20 00	1 30	1 45
Social & Steptoe Con.		T. H. O'Connor, 24 Nassau.	450,000			
Standard Gold		C. B. Bostwick, 169 B'way.	500,000			
Symonds Forks						
Twin River Silver	Nevada	J. F. R. Hadden. 20 Nassau.	800,000	100 00		75
Texas Gold	Colorado		500,000	10 00		
Union Gold	Colorado	F. A. Potts. 110 B'way	1,200,000			
Wash. Mill & Silver	Nevada	W. W. Perkins, 71 B'way	300,000			
Wauba Yuma	Arizona	J. W. Silsby, 36 Pine	6,000,000			

COAL AND IRON COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Coal Co		M. A. Myers, 119 B'way	$1,500,000	$25 00		
Ashburton Coal Co		J. T. Rollins, 41 Pine	2,500,000			
Block House Coal		D. B. Keeler, Jr., 43 Pine.	1,000,000			
Brewster Iron		H. Robison, 165 B'way	150,000			
Broad Top Coal & Iron Co	Pennsylvania	B. Love	2,000,000			
Cameron Coal Co.		J. A. Simpson, 40 B'way	2,500,000			
Carbon Hill Coal Co		J. Silsby, 36 Pine	1,000,000			
Central Coal		F. P. White, 111 B'way	2,000,000	100 00		
Clifton Iron Co		P. H. Riordan, 34 Pine	1,250,000			
Columbia Iron		E. D. Webb, 77 Cedar	1,000,000			
Consolidation Coal	Maryland	J. S. Mackie, 71 B'way	5,000,000			
Crawford Coal		E. Clapp, Prest, 137 B'way.	1,000,000			
Cumberland C. & I. Co.		E. Kisean, 90 B'way	5,000,000			31½
Derby Coal Co		W. S. Davison, 11 Broad				
Dover Coal and Iron Co.		L. Chase, 88 Wall				
Del. & Hudson Canal Co.		R. H Nerderpol, 7 Nassau.	15,000,000	100 00	100	
Ebervale Coal		G.L.Stout, Treas.,111 Br'y.	500,000			
Fall River Bituminous		D. T. Blauvelt, 43 Pine	1,000,000			
Farrar Coal		C. H. Jones, 43 Pine	250,000			
Fisher Iron Co		M. Ellis, 19 William	100,000			
Hamp're & Balt. Coal		S. M. Pond, 70 B'way	500,000			
Iron Cliffs Co		C. J. Canda, 52 Wall	1,000,000			
Jackson Iron		G. P. Loyd, 119 B'way	300,000			
Kemble Coal & I. Co.		R. A. Wight, 26 Ex. Place.	300,000			
Keokuk Coal		J. F. Franklin, 112 B'way.	100,000			
Lackawanna I. & C.	Pennsylvania.	E. C. Lynde, 52 Wall	1,200,000			
Lewis Run C. & I. Co		C. A. Sanborn, 80 B'way	750,000			
Lykens Val. Coal Co.		F. A. Platt, 13 William	800,000			
McKean Co. Bit. Coal Co.		J. H. Rolston, 80 B'way	1,500,000			
Lehigh & Susquehanna		E. W. Cark, Philadelphia,Pa.			1 00	
Mahanoy			400,000	100 00		
McNeal C. & I. Co.		C. C. Godwin, 71 B'way	500,000			
Mount Riga Iron		G. M. Newton, 42 Cedar	300,000			
New Boston Coal		C. H. Ogden, 55 B'way	2,000,000			
N. Y. Con. C. & I. Co.		A. T. Levine, 16 Wall				
N. Y. & Lehigh Coal		T. Simpson, 111 B'way	150,000			
Pacific Coal Co		G. Wrighton, 34 Wall				
Peekskill Iron Co		W. Murdock, 7 Nassau				
Pennsylvania Coal Co		E. H. Mead, 111 B'way	3,200,000	50 00		
Richmond Iron Co		C. H. Smith, 165 B'way	1,000,000			
Scotia Coal Co		I. N. Soper, 42 B'way	2,500,000			
Spring Mt. Coal		C. Runyon, 111 B'way	1,250,000			
Springfield & D'p Run C.		E. D. Webb, 77 Cedar	600,000			
Stout Coal Co		O. S. Comstock, 111 B'way.	500,000			
Susquehanna & Wyoming		E. Potter. 40 B'way	1,000,000			
Tannerdale Coal		I. T. Ludlaw, 71 B'way	250,000			
Wash. Mutual Coal		M. C. Baker, 117 B'way	420,000			
West Point Iron Co.		R. C. Brock, 110 B'way	500,000			
Wilkesbarre C. & I. Co		W. H. Tillinghast. 80 Br'y.	3,400,000			
Wyoming Val. Coal Co.		E. Potter. 40 B'way	1,000,000			

COPPER AND LEAD COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED
Anita Copper	California	J. A. Ferguson, 8 Wall				
Corinth Copper	Corinth, Vermont	S. H. Howard, 191 B'way.	$500,000	25 00		
Davidson Copper						
Eagle Harbor Copper	Michigan	W. H. Smith, 43 Ex. Place.	500,000	25 00		
Evergreen Bluff Copoer	Michigan	F. W. Caper, 44 Ex. Place.	500,000	25 00		
Globe Copper		R. K. Rickard, 19 Nassau.	200,000			
Grand Portage Copper Co		A. S. Kellogg, 22 Pine	500,000			
Guymard Lead		Samuel Vernor, 38 Pine				
Hilton Copper		W. H. Smith, 43 Ex. Place.	500,000			
Hope Copper		J. W. Davis, 19 Nassau	500,000			
Hudson River Copper	New York	T. Clarkson, 22 William	1,500,000			
Indiana Copper Co		J. M. Mills, 25 Nassau	500,000			
Isle Royale Copper	Michigan	F. W. Caper, 44 Ex. Place.	1,000,000			
Keweenaw Copper	Michigan	F. W. Caper, 44 Ex. Place.	500,000			
Lake Superi'r Silver Lead	Michigan	A. S. Kellogg, 22 Pine	1,000,000			
Omiga Copper	Michigan	S. Cooper, 7 Pine	500,000			
Ridge Copper	Michigan	J. L. Gardiner, Jr., 43 Ex. P.	500,000			
Rockland Copper	Michigan	A. Fullerton, 71 B'way	500,000			
St. Joseph Lead	Michigan	J. W. Jones, 6 Broad st,	1,000,000			
St. Marguret Copper		E. P. Sutton, 43 Pine	250,000			
Schoolcraft Copper		R. Walsh, 22 William	500,000			
Superior Copper	Michigan	A. Fullerton, 71 B'way	500,000			
Union Copper		A. S. Kellogg, 22 Pine	500,000			
Vermont Copper	Vermont	J. C. Ely, 191 B'way	500,000		9	10
Wallkill Lead, asst.		S. M. Pond, 70 B'way				

MISCELLANEOUS.	SITUATION MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Zinc Co		W. E. Lawton, 19 Cliff	$1,000,000			
Bigelow Blue Stone Co		H. Bogardus, 14 Pine				
Quicksilver						
Covill B. L. M. & M'f. Co		C. R. Bostwick, 302 Pearl	250,000			
Manhattan Marble		H. K. Gates, 70 B'way	300,000			
N. Jersey Zinc Co	New Jersey	A. H. Farlin, 61 Malden L'e.	1,500,000			

An Exhibition Company.

THE late Legislature of New York chartered an organization under the name of "The Industrial Exhibition Company, the objects of which are set forth in the following section of the charter :—"The said corporation is hereby authorized to purchase and hold such real estate as may be necessary, and to construct thereon such buildings as may be necessary for the maintenance and carrying on of the business of exhibiting the products, goods, wares and merchandise, machinery, mechanical inventions and improvements of every nature, name and kind, and such as are usually exhibited at fairs, and to award and pay to exhibitors therein such prizes and medals and honorary distinctions as they shall deem proper ; and to lease, let, or own stalls, stands, rooms, and places in said building or buildings, upon such terms and conditions as the board of directors shall deem best for the interests of said company, and for the promotion of science, art, commerce and literature. And the said company is hereby further authorized to construct studios and picture-galleries, and to exhibit therein paintings and statuary of any nature and kind, and to award such prizes for the creation of the same as such board of directors may deem proper ; and, generally, said corporation shall have power to carry on in its said buildings, erected for the purposes hereinbefore mentioned, all legal and proper business. And said corporation is hereby further authorized to purchase and hold, by gift, grant, lease, or conveyance, any real estate, or interest therein, which shall be necessary or useful for carrying on the business hereby authorised to be carried on by said corporation." The capital stock of the company is to be seven millions of dollars, divided into seventy thousand shares. The exhibition building is required to be fire-proof and built of solid masonry.

Improved Air Target Pistol.

WE have received from Mr. E. H. HAWLEY, of No. 22 Howard street, New Haven, Conn., a specimen of his air target pistol, which we think excels in many points all others now before the public. It really affords a first-class amusement, and it has accuracy of aim enough for good pistol practice. It sends the dart with surprising force, and makes no noise, dust, smoke or dirt. It is a breech-loader about the size of a navy revolver, and weighs a pound. The motive power is compressed air. We think $3.50 well invested in it. P. C. GODFREY, Room 4, No. 119 Nassau street, New York, is the agent for its sale.

MISCELLANEOUS.

"THE MANUFACTURER AND BUILDER."

A Practical Journal of Industrial Progress

PUBLISHED MONTHLY.

NOW IN ITS SECOND YEAR.

Every Manufacturer and Builder should have it. Every Operative and Mechanic should have it. Every Architect and Mason should have it. Every Painter and Plumber should have it. Every Carpenter and Blacksmith should have it. Every Counting-room and Library should have it. Price within the reach of all.

SUBSCRIPTION ONLY $1 50 PER YEAR.

32 Large Quarto Pages for 15 cents.

348 Large Quarto Pages for $1 50.

Filled with Valuable Reading Matter.

IT COSTS LESS THAN THREE CENTS PER WEEK!!

A single hint in this paper may be worth hundreds of dollars, or prove a fortune to many.

"The Manufacturer and Builder"

Is splendidly illustrated with engravings of everything new relating to manufacturing and building.

GET YOUR CLUBS TOGETHER.

PREMIUMS.

We are induced to offer the following CASH PREMIUMS to those who will work to get up these clubs! $5 00, $10 00, $15 00, $20 00 made in as many minutes! READ! READ! READ!

On every club of	4 names,	at $1 50 each,	$1 00 cash.		
" " "	10 "	" 1 50 "	" 3 00 "		
" " "	15 "	" 1 50 "	" 6 00 "		
" " "	20 "	" 1 50 "	" 10 00 "		

Including 20, and for every additional name obtained above that number, 50 cents each.

Where from ten to five hundred men congregate daily, there is no difficulty in raising these clubs. If the money be forwarded to us with a list of names, the amount of premium may be deducted from the same.

Push the good work, and make glad the hearts of your fellow-workmen.

CLUBS IN VILLAGES AND TOWNS may be procured by any enterprising man or woman. Send for Specimen Copy, Circulars, Instructions, etc., Free. Take them and go among your friends and neighbors. In a half day you will often accomplish the task, and 5, 10, or 15 Dollars will be earned, together with the satisfaction of knowing that you have benefited your fellowmen. Address your orders plainly :

WESTERN & COMPANY, Publishers,

P. O. Box, 5969. 37 Park Row, New York.

☞ For sale by all newsdealers.

FILE-COVERS. FILE-COVERS. For preserving the numbers of the ENGINEERING AND MINING JOURNAL. Price $1.50. For sale by WESTERN & CO., 37 Park Row, New York.

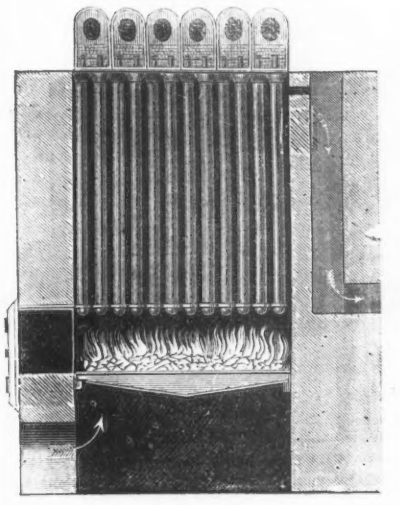
STEAM BOILERS.

THE STEAM GENERATOR

Manufacturing Company of Penn

This Company is now prepared to furnish

WIEGAND'S



Patent Improved Steam Generator,

Of any power required, upon two weeks' notice. They have been introduced in this city and thoroughly tested, with most satisfactory results, and are sold under Guarantee of Absolute

Safety from Destructive Explosion.

They are cheaper in first cost and in expense of erection, more economical in fuel, durable and convenient in use, than any other apparatus for generating steam. For Mining purposes it is unequalled, owing to the facility with which it can be transported and erected.

Office of the Company, 30 North Fifth Street,

Philadelphia, Pa.

Directors—NELSON J. NICKERSON, WALTER J. BUDD EMMOR WEAVER.

NELSON J. NICKERSON, President.

EDWARD H. GRAHAM, Sec. and Treas sep14-1y

WORCESTER STEAM BOILER WORKS, manufacturers of

LOCOMOTIVE, FLUE AND TUBULAR BOILERS OIL AND WATER TANKS,

GASOMETERS, Etc.

WORCESTER, MASS.

N. B.—Boilers inspected and repaired in the best manner and at short notice.

may15-tf CHAS. STEWART, Sup't. D. M. DILLON, Treas.

MISCELLANEOUS.

COOPER'S GLUE AND REFINED GELATINE.

COOPER HEWITT, & CO.,

NO. 17 BURLING SLIP, NEW YORK.

Bar Iron, Brazies' Rods, Wire Rods, Rive and Machinery Iron, Iron and Steel Wire of all Kinds, Copperas,

&c., &c.

RAILROAD IRON, COOPER WROUGHT IRON BEAMS AND GIRDERS,

Semi and Cast-Steel, Gun-Barrel and Compcnent Iron,

PUDDLED AND REFINED CHARCOAL BLOOMS,

Ringwood Anthracite and Charcoal Pig Iron.

Works at Trenton and Ringwood, N. J.

May 17:1y

NOVA SCOTIA.

GOLD MINE FOR SALE.

The Subscriber will sell at Public Auction, at the Merchants' Exchange Reading Room, in the City of Halifax, on WEDNESDAY, the 1st day of June next, at 12 o'clock :

The Gold Mine and Plant in the District of Lawrencetown, lately owned by Glasson and Strange, consisting of—

1st. One hundred and twenty-nine first-class areas, numbered as follows, viz : from 51 to 61 ; from 140 to 161 ; 243 to 258 ; 343 to 359 ; 438 to 463 ; and 538 to 550, all inclusive, in the original block ; and from 395 to 406, 495 to 506, all inclusive, in block No. 5. Many veins have been discovered on this property, all gold-bearing, but only two tested. One of these is a continuation of the vein discovered on the opposite side of the lake by Messrs. Waddlow, from which the present proprietor, James Carson, Esq., of New York City has taken perhaps the richest rock that has been found in the district. It has been sunk on about 15 feet, a few tons of quartz raised, and a test gave 16 dwts. ($16) to the ton. The other vein tested is fed by twelve tributary veins, and two shafts sunk on it, one about 45 and the other about 112 feet deep. In the first gold was struck at 35, and in the second at 55 feet deep. A test at the Montague mills gave a few grains over one ounce to the ton, and the last rock taken from each shaft was the best. In parts this vein is very thick, at the thickest only the width of the shaft (5 feet) being taken out. There are other feeders or tributary veins that will come in to it at a still greater depth, one of them, 5 feet thick, will come into the seam at 180 feet depth.

2nd. Lease of Water Power for 21 years, with privilege of renewal. This furnishes a good power within 100 feet of the main shaft.

3rd. Mining Plant, consisting of Shaft House, Blacksmith Shops and tools, Frame for Flume, and a Building for Driving Machinery, Mining Tools, &c.

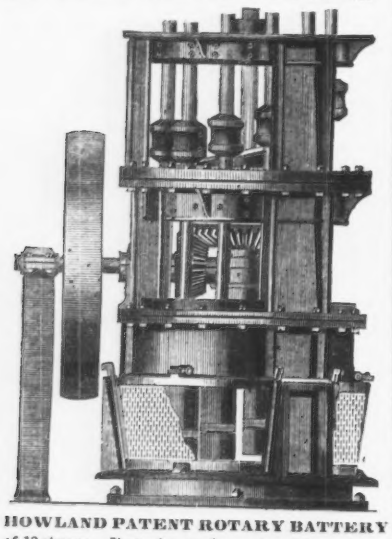
4th. Quartz raised on the ground, estimated at about 500 tons. A good route for a road from the mine to the public highway has been surveyed and laid out by order of the Government.

The title unexceptionable.

May 3:4t CHARLES GRAHAM.

MINING MACHINERY. ETC.

MINING MACHINERY OF ALL KINDS.
MANUFACTURED BY MOREY & SPERRY.



HOWLAND PATENT ROTARY BATTERY

of 12 stamps. It requires no frame to put it up. Guaranteed to crush 2½ to 3 tons per day to the stamp. The best Battery ever used for amalgamating gold, or crushing silver ores, dry or wet. Can be put up on a mine in running order for one-half the price of the straight battery, and in three days after its arrival at the mine. 12-stamp battery, 20,000 pounds, with frame complete, price $3,000; 6-stamp battery, 8,000 pounds, price $1,300. Every mill run at shop before shipping.

CALIFORNIA STAMP MILLS,

All the various styles of Pans, Amalgamators, Separators, Settlers, Concentrators, Dry or Wet, for working Gold, Silver or Copper Ores, the same as built in California and at lower prices. SHOES AND DIES made of the best white iron. Send sizes and we will make patterns and forward Shoes and Dies at low prices. Engines, Boilers and fixtures, and other Machinery made to order. Also, Howland's Patent Rotary Valve Double or Single Engines.

Irons for the best California 10-stamp mill, straight battery, complete, $1,600. Irons for low mortar, old style mill, much less.

☞ Send for a Circular.

Address

MOREY & SPERRY,
Jan 10:y 95 Liberty Street New-York.

B. KREISCHER,
New York Fire Brick

AND

STATEN ISLAND

Clay Retort Works.

Established 1845.

B.K. FIRE BRICK

Office, 58 Goerck Street, Corner Delancy Street, East River, New York. mar28-1y-q

INSTRUCTION.

SCHOOL OF MINES, COLUMBIA COLLEGE.

FACULTY.—F. A. P. BARNARD, S.T.D., LL.D., PRESIDENT; T. EGLESTON, JR., E. M., Mineralogy and Metallurgy; C. F. CHANDLER, PH. D., Analytical and Applied Chemistry; JOHN TORREY, M.D., LL.D., Botany; C. A. JOY, PH. D., General Chemistry; W. G. PECK, LL.D., Mechanics; J. H. VAN AMRINGE, A.M., Mathematics; O. N. ROOD, A.M., Physics; J. S. NEWBERRY, M.D., LL.D., Geology and Paleontology. Regular courses for Mining Engineering; Metallurgy; Geology and Natural History; Analytical and Applied Chemistry. Special students received for any of the branches taught. Particular attention paid to Assaying. For further information and catalogues, apply to

DR. C. F. CHANDLER,
nov21-1y-is Dean of the Faculty.

RENSSELAER POLYTECHNIC INSTITUTE, Troy, N. Y., a School of

ENGINEERING AND PRACTICAL SCIENCE.

Founded, 1824.

The courses of instruction, each extending over four years, are

1. CIVIL ENGINEERING.
2. MINING ENGINEERING.
3. MECHANICAL ENGINEERING.
4. NATURAL SCIENCE.

Degrees conferred in the different departments.

Applicants for admission must not be less than 16 years of age.

The course in Geodesy includes extensive engineering field practice. The proximity of iron, steel, and machine works, together with railroads, canals, and bridges affords great facility for thorough practical instruction. Laboratory privileges unsurpassed. Special courses in Assaying.

For Annual Register giving full particulars apply to

Prof. CHARLES DROWNE, Director.

SAWS.

CIRCULAR SAWS WITH EMERSON'S PATENT MOVEABLE TEETH.

These Saws are meeting with unprecedented success, and their great superiority over every other kind, both as to efficiency and economy, is now fully established

Also,

SON'S PATENT PERFORATED CIRCULAR AND LONG SAWS,

(All Gumming avoided,) and

EMERSON'S PATENT ADJUSTABLE SWAGE,

Spreading, Sharpening, and Shaping the teeth of all s. Price, $5. Manufactured by the

AMERICAN SAW COMPANY

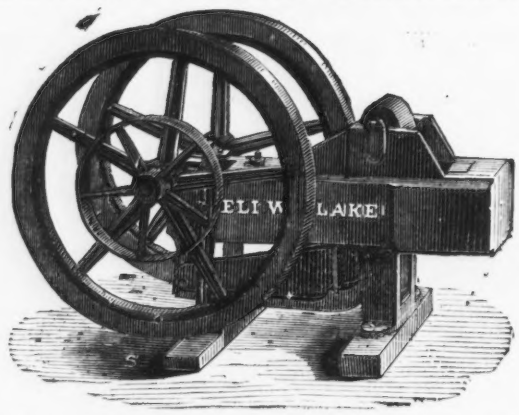
Office No. 2 Jacob St., near Ferry St., New York. Factory, Trenton, N. J. Branch Office for Pacific Coast, No. 606 Front St., San Francisco, Cal.

Send for new Descriptive Pamphlet and Price List.

july1-1y

MINING MACHINERY.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

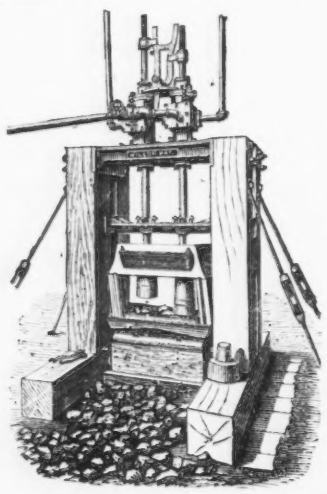
Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

THE WILSON PATENT

Steam Stamp-Mill Company,

OF PHILADELPHIA, PA.

Are now prepared to supply Miners and other parties with their



New Steam Stamp-Mills

AT THE SHORTEST NOTICE.

These Mills have now been in operation for upwards of a year, and have proved to be the most durable and efficient, as well as the lightest for transportation, of any mills now used. The valve gear is of the simplest and most durable construction, readily adjustable by movable cams on the piston rods or stamp stems, thereby giving the operator absolute control of the length and velocity of motion and force of the blow. These Mills are adapted for both dry and wet crushing, and for the hardest rock or softest cement. These Mills are every way equivalent to a Twenty Stamp Mill. For further particulars call on or address

THE WILSON PATENT STEAM STAMP-MILL COMPANY,
Aug31-1y 326 Walnut street, Philadelphia.

ALBERT BRIDGES,
MANUFACTURER AND DEALER IN
Railway and Mining Supplies and Machinery.

Ball's Patent Telescope Jack.

NO. 46 CORTLANDT STREET,
P. O. Box, 2843. NEW YORK.
Aug 31-1y

KROM'S DRY ORE CONCENTRATOR.

Concentration by means of Air

has long been attempted, but hitherto without satisfactory results. **S. R. Krom** has invented and patented machines which concentrate the various ores more perfectly than can be done by any other means.

The *MECHANICAL COMBINATIONS* are extremely simple, the machines therefore correspondingly durable. A continuous self-delivery of ore on one side and tailings on the other is effected, hence very little attention is required except keeping the hopper supplied with ore. The power of one man is sufficient to operate a machine that will concentrate one ton per hour.

PARTIES INTERESTED IN MINING are invited to call at No. 210 Eldridge Street, New York, where they may see a machine in operation, and have samples of their own ores crushed and concentrated.

Illustrated Circulars may be had on application to

STEPHEN R. KROM,
jan10 1y-is No. 210 Eldridge Street, N. Y.

IRON WORKS.

WM. A. SWEET & CO., NO. 33 WYOMING STREET, SYRACUSE, N. Y.,

MANUFACTURERS OF

STEAM-HAMMERS,

ELLIPTIC SPRINGS, CAST-STEEL CROWBARS,

Sweet's Celebrated Steel Tire, and Cast-Steel Sleigh and Cutter Shoes. nov. 16:6m

---

SMITH & SAYRE

MANUFACTURING CO.,

PROPRIETORS AND

MANUFACTURERS

OF THE

Mackensie Patent

BLOWER and CUPOLA and SMELTING FURNACE.

Also, Mackensie's Patent GAS EXHAUSTER and COMPENSATOR. Address

SMITH & SAYRE

MANUFACTURING COMPANY,

95 Liberty street, N. Y. Send for illustrated phamphlet.

Mar26-1y

STEAM PUMPS.

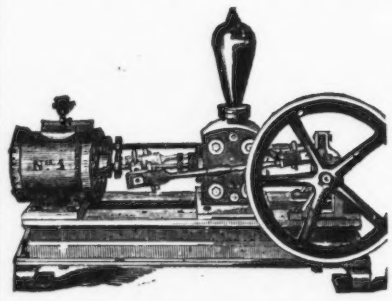
THE WOODWARD

Steam Pump Manufacturing Company.

MANUFACTURERS OF THE

WOODWARD PATENT IMPROVED SAFETY

Steam Pump and Fire Engine.



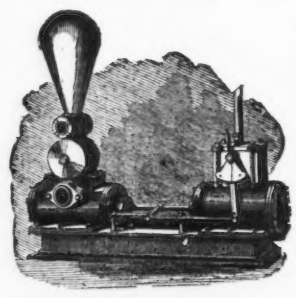
STEAM, WATER, AND GAS FITTINGS OF ALL KINDS.

Also dealers in WROUGHT IRON PIPE, BOILER TUBES, etc. Hotels, Churches, Factories, and Public Buildings, heated by Steam, Low Pressure.

Woodward Building, 76 and 78 Centre street, corner Worth street, New York. Formerly 77 Beekman street.

mar 14-1y GEORGE M. WOODWARD, Pres't.

Niagara Steam Pump Works.



CHARLES B. HARDICK,

9 ADAMS STREET, BROOKLYN, N. Y.

Sole Manufacturer of

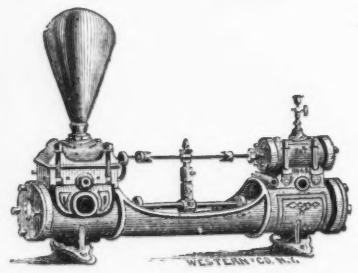
HARDICK'S PATENT DOUBLE-ACTING

Steam Pump and Fire Engine.

Patented in England, Belgium and France. Send for circular. feb-13-1y

---

Knowles' Patent Steam Pump.



FACTORIES AT WARREN, MASS.

WAREHOUSE, NO. 126 LIBERTY STREET, NEW YORK.

Air Pumps, Blowing Engines, Hydraulic Pressure Pumps, New Locomotive Pumps, Fire Pumps, Boiler, Feed, Marine, Drainage, Sugar-work, Brewery, Distillery, Oil and Wrecking Pumps.

Improved Horizontal and Vertical

MINING PUMPS

(Working with Plungers, and especially arranged for pumping water containing dirty or gritty matter.)

Pumps for every possible duty, and all fully guaranteed. Also,

KNOWLES' PATENT SAFETY BOILER FEEDER

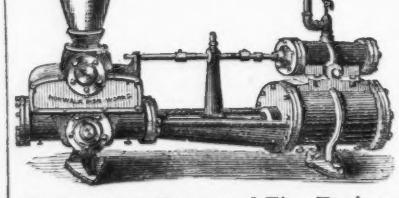
Send for Illustrated Circular. 10-1yjuly

NORWALK IRON WORKS,

SOUTH NORWALK, CONN.,

Sole Proprietors and Manufacturers

OF THE



Earle Steam Pump and Fire Engine,

(Patented in the United States, France, England and Belgium.)

Air and Vacuum Pumps,

STEAM AND BLOWING ENGINES,

Pumping Engines for Water Works, Horizontal and Tumbling Beam Engines, Mining, Wrecking, and Supply Pumps.

IRON AND BRASS CASTINGS, of every description.

☞ Send for illustrated Catalogue. mch13-1y

IRON WORKS.

JOHN A. GRISWOLD, ERASTUS CORNING,

ERASTUS CORNING, JR., CHESTER GRISWOLD.

JOHN A. GRISWOLD & CO.,

PROPRIETORS OF THE

RENSSELAER IRON WORKS,

TROY, N. Y.

Bessemer Steel Works, Fort Edward Blast Furnace and Columbia Blast Furnace.

MANUFACTURERS of PIG IRON, RAILROAD, MERCHANT AND SHIP IRON,

Bessemer Steel Rails, Axles, Tyres, Shafting Plates and Steel Forgings,

OF ALL DESCRIPTIONS.

Office in New York, No. 56 Broadway.

May 17:1y

COAL SHIPPERS.

E. B. ELY & CO., SHIPPERS OF

COAL,

33 TRINITY BUILDING, 111 BROADWAY, NEW YORK.

"Old Company's" Lehigh, J. H. Swoyer's Enterprise, Wyoming, Wilkesbarre, and Locust Mountain Bituminous Coal.

E. B. ELY,
S. W. ELY,
ap24-1y-q

POWELTON COAL AND IRON COMPANY, Sole Shippers of the Celebrated

Powelton Semi-Bituminous Gas

AND ANTHRACITE COALS.

104 Walnut street, Philadelphia.

BRANCH OFFICES:

New York, Trinity Building; 17 Doane street, Boston; Cleveland, O.; Fittsburgh, Pa. jan30-is

LOVE, BOYER & CO.,

SHIPPERS OF

Anthracite and Bituminous Coals,

AMERICAN BUILDINGS, No. 334 WALNUT STREET, And Pier 19 Port Richmond. **PHILADELPHIA.**

Agents for Cumberland Vein Bituminous Coal. Mar 8:6m

HONEY BROOK COAL COMPANY, Exclusive Miners and Shippers of the Celebrated

Honey Brook Lehigh Coal,

No. 111 BROADWAY, NEW YORK.

JAMES H. LYLES, Agent.

Wharves, Port Johnson, N. J. Philadelphia office, 209 Walnut street.

ap20-1y J. B. McCREARY, President.

WILKESBARRE COAL, DELIVERED DIRECT from the Mines of

The Wikesbarre Coal and Iron Co.,

or for re-shipment at

HOBOKEN AND JERSEY CITY.

OFFICE:

ap1-1y No. 80 Broadway, New York.

WHITE, FOWLER & SNOW.

Wilkesbarre and Lehigh Coal,

FOR STEAM AND FAMILY USE.

OFFICE:

Room No. 75, 111 BROADWAY, (Trinity Building).

JNO. WHITE,
LINDLEY H. FOWLER,
LOUIS T. SNOW.
jan1-1y

THE NEWBURGH ORREL COAL COMPANY.

Mines at Newburgh, Preston Co., W. Va.

Company's Office, No. 52 S. Gay St. Baltimore, Md.

C. OLIVER O'DONNELL.....President.
G. W. MAHOOL.....Secretary.

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs., of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. sep21-1y

COXE BRO.'S & CO., CROSS CREEK COLLIERY, Miners and Shippers of the Celebrated

Cross Creek Free Burning Lehigh Red Ash COAL.

FROM THE BUCK MOUNTAIN VEIN.

OFFICES;

Philadelphia, No. 341 Walnut street.

Drifton, Jeddo P. O., Luzerne Co., Pa.

Agent in New York, SAMUEL BONNELL, Jr., Room 43, Trinity Building,

feb-1y 111 Broadway.

DAVIDSON, YOUNG & CO.,

Wholesale Dealers in

LOCUST MOUNTAIN, SHAMOKIN, LEHIGH, CUMBERLAND, SCRANTON, AND WILKESBARRE

COALS.

ROOM No. 16, TRINITY BUILDING, New York.

WM. M. DAVIDSON, SAM'L B. YOUNG, ROB'T K. BUCKMAN

(Formerly of Tyler & Co. may1-1y) (Formerly of Caldwell, Gordon & Co.)

COAL SHIPPERS.

H. H. SHILLINGFORD, Pres't. and Treas.
H. T. SHILLINGFORD, Sec'y.

KITTANING COAL COMPANY,

Sole Miners and Shippers of

BITUMINOUS COAL,

FROM

PHŒNIX VEIN, (BEAVERTON COLLIERY.) | LEMON VEIN, (TUNNEL MILL COLLIERY.)

Unequalled for Steam, Rolling Mills, Forges, Glass Works, Brick Kilns, Lime Kilns, for the Manufacture of Steel and Coke, etc.

OFFICE:

No. 125 South Fourth Street (Forrest Place,)

PHILADELPHIA.

Pier 13 North, Port Richmond, Philadelphia.

THE DESPARD COAL COMPANY OFFER their Superior DESPARD COAL to Gas Light Companies throughout the country.

MINES IN HARRISON COUNTY, West Virginia.
Wharves, Locust Point, } Baltimore.
Company's Office, No. 29 South st. }

AGENTS:

PARMELE BROTHERS, No. 32 Pine street, New York.
BANGS & HORTON, No. 31 Doane street, Boston.

Among the consumers of Despard Coal we name Manhattan Gas Light Co., New York; Metropolitan Gas Light Co., New York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C. Portland Gas Light Co., Portland, Maine.

☞ Reference to them is requested. may30-1y

LEWIS AUDENRIED & CO., MINERS AND Shippers of the following celebrated ANTHRACITE COALS.

From Philadelphia and the Mines,

DIAMOND, Red Ash; SPOHN, Red Ash; ORCHARD, Pink Ash; BROAD MOUNTAIN, White Ash; LOCUST MOUNTAIN, White Ash; BLACK HEATH, White Ash; Old Company's Lehigh; Wilkesbarre.

From Port Johnston and Jersey City,

Old Co.'s Lehigh, Hazleton, Wilkesbarre, and Shenandoah Coals.

Also the superior CUMBERLAND COALS.

BROAD TOP,	BARTON,	BARTON,
SEMI-BITUMINOUS, at Philadelphia.	GEORGES CREEK, at Baltimore.	GEORGES CREEK, at Alexrndria.

205 Walnut street, Philadelphia; 14 Kilby street, Boston 34 Westminster st., Providence; 24 Second st., Baltimore 110 BROADWAY, NEW YORK. Jan13.y

SAMUEL BONNELL, JR., OFFERS FOR SALE his SUGAR CREEK and HONEY BROOK

LEHIGH COALS,

OFFICE:

43 and 45 TRINITY BUILDING, 111 BROADWAY, NEW YORK. Jan1:y

G. B. LINDERMAN & CO.,

MINERS,

Sugar Loaf, Lehigh Coal.

OFFICE, 50 TRINITY BUILDING, 111 BROADWAY, may23-1y NEW YORK.

MARYLAND COAL COMPANY,

CENTRAL COAL COMPANY AND MARYLAND COAL COMPANY, } Consolidated.

OFFICE No. 12 TRINITY BUILDING, No. 111 BROADWAY, NEW YORK,

Miners and Shippers of

GEORGE'S CREEK CUMBERLAND COAL.

HARRY CONRAD, President. HARRY E. HOY, Sec. and Treas.
Sept 28:1y

THE FAIRMONT GAS COAL COMPANY, OF NEW YORK.

OFFICE

TRINITY BUILDING, 111 BROADWAY, ROOM NO. 71.

WHARVES AT LOCUST POINT, BALTIMORE.

MINES AT FAIRMONT, MARION COUNTY, WEST VIRGINIA.

The Fairmont Gas Coal Company, of New York, solicit the orders of Gas Companies for their VERY SUPERIOR GAS COAL.

The Coal from their mines is remarkably free from sulphur, and will be carefully mined and carefully shipped, free of slate and other impurities. This Coal has an illuminating power of 19 candles, yielding over 10,000 cubic feet of Gas to the ton, and an excellent Coke.

Refer to the Manhattan Gas Light Co., of New York, and the New York Gas Light Co., of New York.

N. MEYLERT, President.
HIRAM BENNER, Sec. and Treasurer. Ap5:2t

RANDOLPH BROTHERS, Sole Agents of the original

Spring Mountain Lehigh Coal,

Extensively used for Smelting Iron.

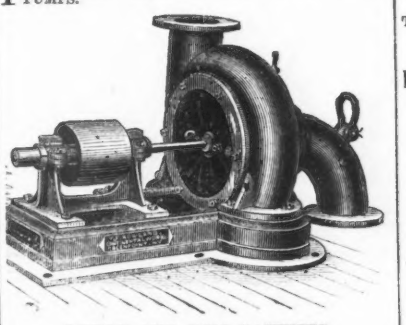
☞ Rooms, 28 and 30 Trinity Building,

apr6tf NEW YORK.

MAGIC LANTERNS FOR SUNDAY Schools, Academies, Public Exhibitions, and Parlor Entertainments. Illustrated priced catalogues sent free. T. H. McALLISTER, Optician, 49 Nassau street, N. Y.
Dec 21.6m

STEAM PUMPS.

IMPROVED MINING AND WRECKING PUMPS.



LEBBY AND DUC PATENTS.

MANUFACTURED SOLELY BY

T. F. ROWLAND, CONTINENTAL WORKS, Greenpoint, Brooklyn, N. Y.

New York Office, No. 64 Broadway, Room 33.

☞ Send for Illustrated Circular. july16-1y-is

J. CLAYTON'S

Patent Fly Wheel and Direct Action

STEAM PUMPS,

HAND PUMP AND STEAM ENGINE COMBINED.

These pumps are the cheapest first-class pumps in the market.

All sizes made to order at short notice.

JAMES CLAYTON, 24 & 26 Water st., Nov18-tf Brooklyn, N. Y.

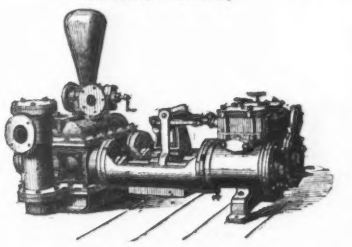
HYDRAULIC WORKS.

MANUFACTORY,

BROOKLYN, N. Y.

Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing; Air and Circulating Pumps, for Marine Engines; Blowing Engines; Vacuum Pumps, Stationary and Portable Steam Fire Engines; Boiler Feed Pumps, Wrecking Pumps,

MINING PUMPS,

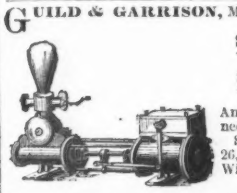


Water Meters, Oil Meters; Water Pressure Engines; Stamp Mills for Gold, Silver and Copper Ore; Eaton's Patent Amalgamators for Gold and Silver; Steam and Gas Pipe, Valves, Fittings, etc. Iron and Brass Castings.

☞ Send for Circular.

H. R. WORTHINGTON,
feb1-1y 61 Beekman street, New York.

GUILD & GARRISON, MANUFACTURERS OF

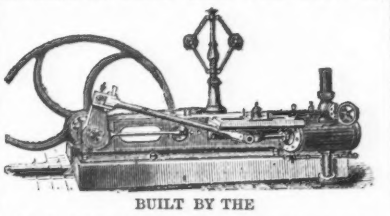


Steam Pumps, Vacuum Pumps, Steam Engines, Vacuum Pans,

And all the various connections. For sale at the STEAM PUMP WORKS, 26, 28 and 30 First street, Williamsburgh, N. Y. sep14-6m

ENGINES, IRON WORK, ETC.

RIDER'S PATENT CUT-OFF ENGINES, **HORIZONTAL and VERTICAL,**

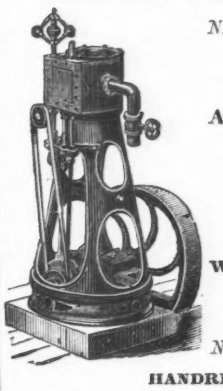


BUILT BY THE

DELAMATER IRON WORKS,

Foot of West Thirteenth Street,

NEW YORK CITY.



AND BY THE

Albany St. Iron Works,

Corner of

Washington and Albany Streets,

NEW YORK CITY.

HANDREN & RIPLEY, Proprietors.

Also BOILERS, TANKS, and CASTINGS, of all descriptions nov 2:1y

PUBLICATIONS.

NOW READY.

Third Edition, Seventh Thousand, Revised, Enlarged, and Improved,

HOPTON'S CONVERSATIONS on MINES,

BETWEEN

FATHER AND SON,

ENLARGED FROM 112 TO 192 PAGES.

The Following are the Contents:

Air, why it is propelled down, into and around the workings
" Quantity of, produced by the furnace.
" Friction of
" The great friction of produced by one mode of ventilation, and how reduced by another
' Pure added to impure (plans.
' Splitting of (plans)
" One current of (plans)
" One current of, and how to adopt separate currents (plan)
" Dividing of, but not into "separate and and distinct" current (plans)
" Crossings (see H on plans)
" Weight of in shafts
" How to find the weight of
" Table of pressure in shafts
" Expansion of
" Its velocity and force
" Rush of, into each division
" Quantity produced by natural ventilation
" Splitting, why it should be adopted
" Splitting, why the workmen object to Mr. Hopton adopting the mode
Anemometer, measurement of air by, engraving of
Area of a pit, how to find
Barometers, Showing the time of an outlet of gas in mines (engraving)
Bricks, how to find the number in the walling of a shaft.
Buddle's plan
Circumference of a pit, how to find
Coal, several ways of working it out, and why man methods of working it out are adopted
" Working out in banks (plans)
" Working it out in following up banks (plan)
" Working out in pillars (plans)
" Working out in long wall (plans)
" Working out in drifts (plans)
" Working out with no regularity (plan)
" Working out by the "end way" or in endings (plan)
Cubical Contents of a pit, how to find
Dialing, the mode of
Dials, several engravings
" How constructed
" How fixed in mine surveying
" Needle, its variations
Diameter of shaft
Dip of mine, how to find and lay on (plan)
Explosion, the power of an
" At Lund-hill, in what part of the mine it was supposed to take place (plan)
" How the power may be diminished
Furnace, how to find the horse-power of
" The place of fixing, to produce the largest ventilating current
" Engravings of ground floor, front and back view
" Remarks upon
Gases, (carbonic acid) composition of
" Do. properties of
" (After, or choke damp) composition of
" (Carburetted hydrogen) do.
" Choke damp and carbonic acid, not one and the same in qualitty
" The effect produced on people by inhaling such
" The quantity required for an explosive mixture
" The elasticity of
" The weight of
" The nature and quality of
" Why some mines generate and produce more than others
" Why some mines generate a mixture of
Goaf, or gob, how tramrods are made through (plan)
Lund-hill (plan)
Managers, who are best competent to manage mines
Miscellaneous questions
Natural ventilation
Planning, how workings are laid on the plan
Regulations (see K on plans)
Safety Lamps, why flame will not penetrate through, engraving of
Sections on mechanical ventilation
Summary of accidents
Surveying, how mines are with the dial
Surveying, how mines are with the theodolite
Tables of weights and measures
Temperature on surface
Temperature in mines
Temperature, difference of between down and up-cast
Theodolites for mine surveying
Theodolites, how constructed
Theodolites, the magnetic needle dispensed with, and how workings are laid on plan, with Theodolite surveying
Theodolites, how mines are surveyed with them
Up-cast larger than down-cast (plan)
Ventilating mines by mechanical power
Ventilation, several ways of
Weather, how a change of affects the workings
Workmen, capabilities of

Testimonials, Reviews, etc.

"Such a work, well understood by miners, would do more to prevent colliery accidents than an army of inspectors."—*Colliery Guardian.*

"The book cannot fail to be well received by all connected with collieries."—*Mining Journal.*

"Its contents are really valuable to the miners of this country."—*Miner's Conference.*

"I have works priced at £4 that do not contain the same information."—W. W. KENRICK, Colliery Viewer.

"The work is replete on the subject of underground management."—M. BARNES, Colliery Proprietor.

"I have had twenty years' management. It is the best work I ever read, and deserves to be circulated in every colliery district."—JOSEPH EAMES.

WESTERN & CO.,

Sole Agents for the United States.

For sale at the office of the ENGINEERING AND MINING JOURNAL, 37 Park Row, New York, and through any Bookseller. Price $1.

AGENTS AND CANVASSERS WANTED IN EVERY CITY AND TOWN IN THE UNITED STATES,

FOR THE

Engineering and Mining Journal.

Liberal inducements. Specimens sent free. Address

WESTERN & COMPANY,

37 Park Row, New York.

PUBLICATIONS.

"THE

MANUFACTURER and BUILDER"

AN ILLUSTRATED MAGAZINE OF INDUSTRIAL PROGRESS.

Aside from those purely commercial objects which form the mainspring of every business undertaking, the publishers of THE MANUFACTURER AND BUILDER seek to promote the *diffusion of useful, practical knowledge*, and to furnish to those engaged in the industrial arts a journal which will enable them to keep abreast of the wonderful developments which in these modern times result from the application of science to the arts. Without being trammelled by any special classification, or confined in its scope by the narrow limits of any particular trades or profession, they would offer the following synopsis as presenting a few of the prominent topics which have been discussed in its pages.

ARCHITECTURE.

This subject has been treated both as one of the fine arts and as a means of providing shelter for man and his works. Every improvement connected with the art of building, whether that improvement relates to beautifying the appearance, increasing the value, strength, and durability, or lessening the cost of erection, finds a legitimate place in its pages.

THE MOTORS,

Amongst the great agents in the improvement of the arts, none are more important than the Motors—steam, water, and wind. These, in all their various modifications, will receive full attention, and every improvement will be carefully noted and discussed.

CIENCE APPLIED TO THE ARTS,

for example, the application of modern chemical discoveries to dyeing, of electricity to various processes, of magnetism to the examination of iron, have all received attention at the hands of the editors.

THE HOME DEPARTMENT

Is devoted to matters of immediate interest to the domestic circle, whether that matter be of practical or merely general interest. In short, everything of interest to our American homes may here be legitimately discussed.

ILLUSTRATIONS.

In connection with these varied subjects, the journal, during the first six months, contained upwards of 150 illustrations, some of which were of a degree of artistic excellence rarely seen in purely technological journals.

FORM AND SIZE.

Each number of THE MANUFACTURER AND BUILDER comprises 32 large quarto pages, cut, stitched, and bound within an engraved cover. At the close of every year subscribers have a book, when bound, of

384 Pages, with upwards of 300

Engravings.

In presenting to the public the peculiar features of THE MANUFACTURER AND BUILDER, we have preferred to speak in the past tense. We have referred to what we have done as an earnest of what we hope to accomplish in the future. One object that we have kept steadily in view is the increase of our circulation, so that, as an

Advertising Medium,

THE MANUFACTURER AND BUILDER may ultimately rival any journal in the country. We have sought to effect this by placing the subscription price at the extremely low figure of

One Dollar and a Half per Year,

with liberal discounts to those who may get up clubs.

The advertising rate is $3.75 for one-half inch space per month, or 75 cents per line each insertion. Special contracts made for long periods.

A specimen copy of THE MANUFACTURER AND BUILDER will be sent free to parties contemplating advertising or getting up clubs.

Address,

WESTERN & COMPANY, Publishers,

37 Park Row, New York.

PUBLICATIONS.

PUBLICATIONS OF THE

AMERICAN INSTITUTE OF ARCHITECTS.

WESTERN & COMPANY

Having made arrangements with the Committee on Library and Publications of the above Association, are prepared to furnish the publications of the Institute to the trade and the public.

The Publications consist of the Proceedings of the Annual Conventions of the Institute, and Papers read before the Chapters of that body, as well as Papers contributed by Members of the Institute and published by its Committee on Library and Publications.

They are elegantly printed Pamphlets of large quarto size, with two columns to a page.

The Pamphlets thus far issued comprise the publications for two years past, and cover transactions of three years.

LIST OF PUBLICATIONS TO DATE.

I.

PROCEEDINGS OF THE ANNUAL CONVENTION OF THE

American Institute of Architects,

Held in New York, October 22d and 23d, 1867.

Comprising, Minutes of the Convention, The Annual Address by Richard Upjohn, President; Reports of the Trustees and Standing Committees, and the Closing Address.

32 Pages, Quarto.....Price, 30 cents.

II.

FIRE-PROOF FLOORS

FOR

Banks, Insurance Companies, Office Buildings, and Dwellings.

Tables Shewing the Distances from Centres at which Rolled Iron Beams should be Placed, and the Weight of Metal per superficial foot of the Floor,

BY R. G. HATFIELD, F. A. I. A.

8 Pages, Quarto.....Price, 30 cents

III.

Proceedings

OF THE

SECOND ANNUAL CONVENTION

Held in New York, December 8, 1868

Comprising the Minutes of the Convention, The President's Address by Richard Upjohn, Esq., and the Reports of Trustees and Standing Committees.

16 Pages, Quarto.....Price 40 cents

IV.

REMARKS

ON

FIRE-PROOF CONSTRUCTION;

A Paper read before the New York Chapter of the American Institute of Architects, April 8, 1869.

BY P. B. WIGHT, F. A. I. A.

8 Pages, Quarto.....Price, 30 cents.

V.

THE

Architectural and Other Art Societies of Europe;

SOME ACCOUNT OF THEIR

ORIGIN, PROCESSES OF FORMATION, AND METHODS OF ADMINISTRATION,

With suggestions as to some of the conditions necessary for the maximum success of a National American Architectural-Art Society, with its local dependencies.

BY A. J. BLOOR,

FELLOW OF THE AMERICAN INSTITUTE OF ARCHITECTS

Read before the New York Chapter A. I. A., February 16, 1869.

62 Pages, Quarto..... Price, $1

VI.

PROCEEDINGS OF THE THIRD ANNUAL CONVENTION, held in New York, Nov. 16 and 17th, 1869.

Comprising the Annual Address by Richard Upjohn, President; the Reports of Trustees, Standing Committees and Chapters; papers read by Adolph Chess, R. G. Hatfield, and Richard Upjohn; Debates on matters of Professional interest, and the closing address of Professional Guilds, by E. L. Godkin. 69 pages quarto. Price $1.

The above Pamphlets may be had singly, and will be sent by mail to any address on receipt of the price.

THE TRANSACTIONS BOUND.

The Publications of the Institute may also be had bound in cloth, making a handsome quarto volume of 126 pages, comprising the Transactions of the Institute for three years, ending November 16, 1869, the time of holding the Annual Convention for the present year. Price, $3.

WESTERN & COMPANY will also publish the papers to be read at the meetings of Chapters of the Institute, during the coming year in the ENGINEERING AND MINING JOURNAL, and abstracts in the MANUFACTURER AND BUILDER, which will be duly announced. Address

WESTERN & COMPANY

No. 37 PARK ROW, NEW YORK.

PUBLICATIONS.

THE MINES OF THE WEST:

A REPORT TO THE

SECRETARY OF THE TREASURY,

Being a full Statistical Account of the

MINERAL DEVELOPMENT OF THE PACIFIC STATES

for the year 1868, with

Sixteen Illustrations,

and a Treatise on the Relation of Governments to Mining, with a delineation of the Legal and Practical Mining Systems of all Countries, from early ages to the present time. By

ROSSITER W. RAYMOND, PH.D.,

U. S. COMMISSIONER OF MINING STATISTICS.

CONTENTS:

INSTRUCTIONS FROM THE SECRETARY OF THE TREASURY.

LETTER OF THE COMMISSIONER TO THE SECRETARY.

REPORT:

PART I.—Observations of the present condition of the mining industry:

SECTION I.—*Notes on California:*

Chapter I.—The new Almaden mines.
II.—The Mother Lode of California.
III.—The quartz and placer mines o Nevada County.
IV.—Giant powder and common powder.

SECTION II.—*Notes on Nevada:*

Chapter V.—Present condition and prospects of the Comstock mines.
VI.—Ormsby, Washoe, and Churchil Counties.
VII.—Lander County.
VIII.—Nye County.
IX.—Lincoln County.
X.—EsmeraldaCounty.
XI.—Humboldt County.

SECTION III.—*Notes on Montana:*

Ohapter XII.—General geological features.
XIII.—Population, property, railroad, etc.
XIV.—Placer mines.
YV.—Quartz mines.
XVI.—Operations of the United States law.

SECTION IV.—*Notes on Idaho:*

Chapter XVII.—Report of Mr. Ashburner
XVIII.—The War Eagle tunnel.
XIX.—Bullion product.

SECTION V.—*Notes on other mining fields:*

Chapter XX.—Arizona.
XXI.—Utah.
XXII.—The Isthmus of Panama.

PART II.—The relations of government to mining:

Introduction.

SECTION VI.—*Mining law.*

Chapter XXIII.—Mining and mining law among the ancients.
XXIV.—Mining law in the middle ages.
XXV.—The Spanish mining law.
XXVI.—Modern German codes.
XXVII.—The code of France.
XXVIII.—Mining law of Switzerland.
XXIX.—Mining law of Englaud.
XXX.—Mining regulations of Australia.
XXXI.—Mining laws of Canada.
XXXII.—Conclusions.

SECTION VII.—*Mining Education:*

Chapter XXXIII.—Means of disseminating information with regard to mining and metallurgy; the National School of mines.

SECTION VII.—*Mining Education—Continued.*

Chapter XXXIV.—The Freiberg School of Mines.
XXXV.—The Paris School of Mines.
XXXVI.—The Prussian School of Mines.
XXXVII.—The School of Mines at Clausthal.

APPENDIX.—Statistics of bullion, ores, etc., at San Francisco, for the Year 1868.

EXTRA CLOTH, $1 75.

Address,

WESTERN & CO.,

No. 37 PARK ROW, New York

ENGINEERS.

P. H. VAN DER WEYDE, M. D.,

(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)

Analytical & Consulting Chemist and Engineer.

RESIDENCE, 73 Seventh Street.

Office ENGINEERING AND MINING JOURNAL, 37 Park Row, New York City. jan30tf

R. P. ROTHWELL,

MINING AND CIVIL ENGINEER AND METALLURGIST,

From the Imperial School of Mines, Paris, member of the Geological Society of France, etc,

OFFICE, WILKESBARRE, PA.

Having had a large practical experience in Europe and this country, is prepared to examine and report on all kinds of mineral property, superintend mines, and metallurgical works, assay ores, etc. 18-2-qp

EDWARD C. MILLER, ARCHITECT AND CIVIL ENGINEER, Nos. 4 and 6 Broad street, Rooms 17 and 17½.

Has been engaged for many years in preparing plans for Churches, Dwellings and other Buildings, and in superintending their erection, and has superintended a considerable portion of the various constructions in the Central Park of New York, and Prospect Park, Brooklyn, having, in the latter case, prepared the plans, specifications and estimates of all the Bridges, the Fountain Basin, and minor works of adornment, upon which these structures have, for the most part, been completed. Is now ready to furnish Designs, Working-Drawings and Specifications for any description of building, and to superintend the construction thereof. References: Jas. S. T. Stranahan, Esq.; Martin Kalbfleish, Esq.; Andrew H. Green, Esq.; Charles Hudson, Esq. mar 8

A. D. BRIGGS & CO.,

Civil and Mechanical Engineers,

BUILDERS OF

Tuesdell's Patent Truss Bridge, and other Iron Bridges, Roofs, and Turn-Tables. Also Howe's Patent Truss Bridge and Roof, and other Timber Bridges and Turn-Tables. Particular attention given to repairing all kinds of Bridges. All work warrantad to give satisfaction. Plans, Estimates, and Specifications, upon application.

July 20-1y SPRINGFIELD, MASS.

ADOLPH OTT,

CHEMICAL ENGINEER,

May be employed professionally as an expert on practical subjects, involving both Chemical and Mechanical knowledge. A specialist in various branches of Technology. Assays and Analyses of all kinds. Address, Editorial Rooms of the "Engineering and Mining Journal," 37 Park Row, New York City.

☞Written communications preferred. nov28-tf

VIRGINIA AND WEST VIRGINIA MINERAL LANDS.

R. P. ROTHWELL will shortly commence an extended examination of the Coal and Iron Deposits in several portions of Virginia and West Virginia, and will be happy to undertake the examination of mineral properties for those owning or desiring to invest in those States. Address immediately,

R. P. ROTHWELL, Mining Engineer,

Ap 5-tf Coalburgh, Kanawa Co., Pa.

THEODORE ALLEN,

ENGINEER,

No. 45 William street, New York.

Designs and Specifications prepared for all kinds of Iron Ships and Steam Machinery. Construction and Repairs superintended. Experiments conducted. Advice given, etc. All kinds of Machinery furnished Manufacturers' prices. feb8-tf

WILLIAM E. GUY,

after a three years' course at the Academy of Mines in Freiberg, Saxony, seeks a position as

MINING ENGINEER OR METALLURGIST.

Intends to make a trip to Colorado, Nevada and California in the Spring and Summer, and is prepared to make reports on mines and claims. Address, No. 68 West Third street, Cincinnati, Ohio. feb8-4t

JULIEN THOULET, GRADUATE OF THE University of Paris, Member of the Society of Engineers of France, employed for several years in Spain, Italy, and America, as Chemist and Mining Engineer, would accept an engagement in a mining or smelting establishment. The highest references furnished.

Address, by letter, No. 3 William street, New York. Feb. 15:tf

BENJAMIN SMITH LYMAN,

MINING ENGINEER,

GEOLOGIST AND TOPOGRAPHER,

No. 135 South FifthStreet, Philadelphia.

DUNCAN, SHERMAN & CO.,

BANKERS,

Corner of Pine and Nassau Streets, New York.

Circular Notes and Letters of Credit for Travelers, available in all the Principal Cities in the World.

TRANSFERS OF MONEY TO EUROPE AND THE PACIFIC COAST BY TELEGRAPH.

☞Interest allowed on Deposits. feb-1y

E. F. DUNNE,

Attorney and Counsellor at Law,

1301 F STREET, WASHINGTON, D. C.,

PACIFIC COAST.—Will practice in all the Federal Courts. Specialty in Patents for Lands, Mines, and Town-Sites. mar15-1y

WILLIAM F. McNAMARA,

SOLICITOR OF PATENTS

AND COUNSELLOR-AT-LAW.

No. 37 PARK ROW, NEW YORK, ROOM 22.

Advice in Patent Law given free. mar 8:tf

ED. SEARS' WOOD-ENGRAVING ESTABLISHMENT.

Engraving, Designing, and Photographing on Wood, in all its branches, viz: Portraits, Fine Book Work, Machinery, Maps, Buildings, Illustrated Catalogues, Views, etc.

N. B. Special attention given to Color Work of all descriptions.

48 BKEEMAN STREET, NEW YORK.

MICROSCOPES FOR SCIENTIFIC INVESTIGATIONS and Educational Purposes. Price list sent free. T. H. McALLISTER, Optician, Dec 21-6m 49 Nassau street, N. Y.

"THE MANUFACTURER & BUILDER,"

ITS GREAT SUCCESS! WHY PEOPLE SUBSCRIBE TO IT!

CONTENTS FOR ITS FIRST SIX MONTHS.

Show it to your Friends.

THE success which has attended our efforts to provide a first-class Monthly, devoted to the interests of the industrial classes, has far exceeded our most sanguine anticipations. THE MANUFACTURER AND BUILDER has been received with favor by every class of the community. Manufacturers have taken it for the information which it gives in regard to the improved processes in which they are interested; mechanics have taken it for the instruction which it conveys in regard to matters pertaining to special arts and trades; professional and literary men have taken it for the information which it conveys in regard to the progress of the industrial arts; people, in general, have taken it because it contains much pleasant reading matter for the family circle. That all these classes have been right in their estimate of this journal, will be evident to any one who will read the Table of Contents which we here append. When we state that these articles are almost all derived from original and authoritative sources, it will be seen that we have presented a body of **PRACTICAL, THOROUGH, AND RELIABLE INFORMATION**, such as can nowhere else be obtained for the sum charged for a year's subscription to THE MANUFACTURER AND BUILDER.

Subscription $1.50 per Annum, with Liberal Club Rates and Premiums.

Table of Contents of the First Half-Volume of "The Manufacturer and Builder,"

[ILLUSTRATED ARTICLES ARE MARKED WITH AN ASTERISK.]

JANUARY.

*Gold and Stock Telegraphy, ... 1
Persian Arms, Damask Steel, and Damaskeening, ... 2
How to cause a Tempest in a Teapot, ... 2
The Causes of the Difference in the Color of Bricks, ... 3
How to make different Cements, ... 3
Learned Blacksmiths, ... 3
*Dove-Tail Joints, ... 4
Wall-damp, ... 5
The Utilization of Tin Scraps, ... 6
The Firmness of Paper, ... 6
New City Buildings, ... 7
*Have you ever looked through a Microscope? 8
The Mechanic and his Work, ... 8
Reversible Seats, ... 9
Preventive of the Decay of Wood, ... 9
Colorado Manufactures, ... 9
Chemical Engineering, ... 10
The New Art of Fresco-Painting, ... 10
"Old Says" on Building, ... 11
The Progress of Building, ... 11
Chrome-Yellow Paint, ... 11
*Hints for Sign-Painters, ... 12
Imitation-Marble, ... 13
Common Mortar, ... 13
New Paint for Floors, ... 13
Apatite; Its Importance in Domestic Economy, ... 14
Gun-Cotton, ... 14
The Preservation of Wood by Immersion, ... 14
Ventilation and Heating by Currents, ... 15
Cement and Mortar of the Ancients, ... 15
Bridging the Missouri, ... 16
*The Park Bank Building—A Palace of Finance, ... 17
The Air in Lecture and School-Rooms, ... 18
Prize Problems, ... 19
Glass, ... 19
*Improvement in Saws, ... 20
Hoosac Tunnel, ... 21
*Deep-Sea Cables, ... 22
An Important Invention, ... 22
To the Public, ... 22
Trades' Unions in the United States, ... 23
Literary, ... 23
Mechanics' Homes, ... 24
*Long Island Villa, with Mansard Roof, ... 24
*Villa Cornice Work, ... 25
Chudren's Toys, ... 25
To the Press, ... 26
Occupations and Wages in California, ... 26
Queries, ... 27
Special Notice to Travellers, ... 27
Advertisements, ... 27

FEBRUARY.

*Portable Wainscoting, ... 33
Ventilation and Warming, ... 34
A Few Words about Bricks, ... 35
*The Bessemer Process and its Late Improvements, ... 35
Wire-Rope, ... 37
Hollow Walls, ... 39
Rock-Drilling Machine, ... 39
Mr. Mudge on Woolen Manufactures, ... 39
*Water-Proofing Dress Goods, ... 40
Insoluble Cements, ... 40
Atmospheric Action on Building-Stones, ... 40
*Anatomy of the Screw, ... 41
Lead Pencils, ... 41
Artificial Light and the Subject of Ventilation, ... 42
Architecture and Civilization, ... 43
Arches—Old and New, ... 43
*Manufacture of Sheet Tin, ... 44
Rates of Travel, ... 44
*Hand-Power Machine, ... 45
The History of Windows, ... 45
To Restore Burnt Cast-Steel, ... 45
To Bleach Palm-Oil, ... 45
The Building-Stone and Slate of Virginia, ... 46
The New-York Milling Interest, ... 47
*The New-City Post-Office, ... 48
Review of City Buildings, ... 50
Decay of Wood and Processes for Preserving it, ... 51
The Daguerrean Process, ... 51
To obtain Different Shades of Chrome-Yellow, ... 52
*Improved Cupola and Blower, ... 52
Literary, ... 54
Real Estate for Workingmen, ... 55
The Philosophy of Building, ... 55
*Villa and Cottage Architecture, ... 56
Consumption of Milk, ... 57
Trades and Professions, ... 58
Bread-Making, ... 58
Castle-Garden, ... 58
Queries, ... 59
Special Notice to Travellers, ... 59
Advertisements, ... 59

MARCH.

*Brick-Making, ... 65
Absorbent Capacity of Bricks, ... 66
Lake Colors—Their Nature and Manufacture, ... 67
*Steam-Dredging and the Suez Canal, ... 68
The Selection of Wall-Paper, ... 71
*Marble Paper Manufacture, ... 71
Sand-Grinding Machine, ... 73
*The Gothic Furnace, ... 74
Ventilation and Heating by Currents, ... 74
*The Ventilation and Warming of School-Houses, ... 75
*Iron Buildings, ... 76
Hints on Economic Building, ... 78
Copper and its Alloys, ... 79
Cryolite—Where found, Nature, and Uses, ... 80
Chrome-Orange, ... 80
*Illinois State Capitol Design, ... 80
The Uses of Gun-Cotton, ... 82
Terra Cotta, ... 82
Building-Stones—Their Preservation, ... 82

APRIL.

*Improvement in Hand-Drills, ... 97
Renovating Silk Hats, ... 97
Memoranda concerning Nails, ... 98
Comparative Weight of Pattern and Castings, ... 98
Flint-Glass, ... 98
Wolfram or Tungsten Steel, ... 99
Cheap Brick Walls, ... 99
*Stereotyping, ... 99
Edge-Tools, ... 102
Road-Dust and Vegetation, ... 102
Aniline Colors, ... 102
Soap-Making in the Olden Time, 103
*Manufacture of Vinegar, ... 104
Textile Fabrics from Glass, ... 104
The Effect of Artificial Light upon the Eyes, ... 105
*The Daguerrean Process, ... 105
Building in California, ... 105
The Piano-Forte, ... 106
The Art of Gilding, ... 106
Ventilation and Warming, ... 107
*Ventilation and Warming of School-Houses, ... 108
*The New-York Fire-Place Heater, ... 109
Cheap Houses—Building on Piré, ... 110
*The Vermont Slate Industry, ... 83
Literary, ... 86
"Too Many Irons in the Fire," 87
The Tinning and Silvering of Looking-Glasses, ... 87
*French Sash-Windows, ... 88
*Whence Came our Silks? 88
*Cottage and Villa Architecture, ... 89
What shall Workingmen Read? 90
The Dwarf Builders, ... 90
Nature as a Builder, ... 91
Sharpening Files by Corrosion, ... 92
Queries, ... 92
Special Notices, ... 92
Advertisements, ... 92

MAY.

*The Telephone, ... 129
Peroxide of Hydrogen for the the Hair, ... 130
The Daguerrean Process, ... 130
Glue, ... 130
How to put a Cross-cut Saw in Order, ... 131
Coraline Dye—Injurious Effects Therefrom 131
Mixing Things Up, ... 131
*On Boiler Explosions, ... 132
How to Repair Chain Pumps, ... 134
New Element, ... 134
*Béton Building, ... 135
Hydraulic Mortar, ... 135
Shellac for Water-Proof Coatings, Dyes, Paints, and Printing Inks, ... 136
*Improvement in Billiard Tables, ... 137
Historical Notes on Paper Manufacture, ... 137
Kalsomining Walls, ... 138
A Plea for Stone, ... 138
On Forging, Hardening, and Tempering Mill-Picks, ... 139
Chrome-Yellow Paint Practically Tested, ... 138
*Water-Closets, ... 140
Welding Copper, ... 140
The Largest Suspension Bridge, 140
*Improved Hoisting Apparatus, .141
Colored Marbles, ... 141
The Piano-Forte, ... 142
Thames Embankment—South side, ... 142
Seaweed Charcoal, ... 142
Ventilation and Warming, ... 143
The New Metal Hydrogenium, ... 144
Painting Zinc, ... 144
Artificial Alizarine for Coloring, .144
Priscian a little Scratched, ... 144
Suez Canal, ... 144
*The New State Emigrant Hospital, Ward's Island, ... 145
Magenta, ... 145
Varnishes for Iron, ... 147
Ornamental Glass—Opaline and Enamel, ... 147
Ship-Building—Here and in England, ... 147
Industrial Progress, ... 147
A New Ornamental Wood, ... 148
Sprinkling Streets with Deliquescent Salts, ... 148
*Old and New Fire-Grates, ... 148
Effect of Cold upon Tin, ... 148
Cryolite as a Source of Soda, ... 149
Literary, ... 150
Credit, ... 151
On Going Surety, ... 151
Interior Decorations, ... 151
*Church Architecture, ... 152
*Ornamental Work—Ceiling and Railing, ... 153
Purifying Water, ... 154
Adulterations, ... 154
Indelible Inks, ... 155
New Cements, ... 154
Welding Steel to Iron, ... 154
Queries, ... 155
New Advertisements, etc., ... 156

JUNE.

*Improved Steam Pump, ... 161
What Paint shall we use? 162
Varnishes—their Nature and Manufacture, ... 162
Something of practical Importance in the Use of Plaster-of-Paris, ... 163
Influence of Water in the Manufacture of Wax-Leather, ... 163
Why do we Oil our Whetstones? .163
Compressed Leather, ... 163
*The Art of Electrotyping, ... 164
Practical Hints on Working and Tempering Steel, ... 166
Spiritual Photographs, ... 167
"Too Much Pork for a Shilling," 167
Credit to whom Credit, etc., ... 167
Store-Shutters, ... 168
Damp Cellars, ... 168
The Velocipede as a Mechanical Agent, ... 168
Calculating Areas by Weight, ... 168
Aniline Gray, ... 168
The Generation of Oxygen Gas from Sulphuric Acid, ... 168
*On Testing Iron by Magnetism, 169
Blowing a Wine-Glass, ... 169
How Jewelry is Made, ... 172
American Wheels, ... 170
Ventilation and Warming, ... 171
The Manufacture of Pins, ... 171
Right-Handand Left-Hand Locks 171
Lisieux and its Linen Factories, 171
Cleaning Gilded Ware, ... 171
Encaustic Tiles, ... 172
*Salt—its Manufacture and Uses, 172
Paper Belting, ... 173
Vegetable Oils—their Production and Purification, ... 174
Chimneys and Chimney-Shafts, .174
Artificial Stone, ... 175
Plank Walls for Cottages, ... 175
New Fact in the Behavior of Iron, ... 175
Science and Art, ... 175
*The Kansas City Bridge, ... 176
Cement to resist Red Heat and Boiling Water, ... 178
Recovery of Fatty Matter from Waste Soap-Waters, ... 179
Paper Houses, ... 179
Sodium as a Substitute for Phosphorus in Lucifer Matches, ... 179
A Plea for Iron, ... 179
To Keep Nails from Rusting, ... 179
*Wrought-Iron Arch Girder Bridge, ... 180
Liquid Fuel, ... 181
New Mode of Breaking Masses of Iron, ... 181
Utilization of Street Dust, ... 181
Literary, ... 182
How to Spoil a Husband, ... 183
Chess, ... 183
A New Alloy, ... 184
*A Country or Suburban Barn, .184
A New Material for Bonnets, ... 185
*Design for a Summer House, ... 185
Workingmen as Students, ... 185
Eating, ... 185
The Philosophy of a Candle, ... 186
Adulterations, ... 187
Recipes for Earthern-Ware Glazing, ... 187
Hemp, ... 187
A Poor Prospect for the Year 1900, ... 188
Setting Fence-Posts, ... 187
Queries, ... 188
New Advertisements, ... 188

The above speaks for itself. In a period of six months we gave upwards of **500 COLUMNS OF MATTER,** from the pens of the best writers in the country and presented in connection therewith upwards of **150 ENGRAVINGS!** The second half volume is equal to the first half in every respect, and it is our determination, during **1870,** to even surpass all our former efforts and make the MANUFACTURER AND BUILDER **INDISPENSABLE** to every

MECHANIC, ARCHITECT, BUILDER, ENGINEER, CARPENTER, MACHINIST, AND LABORING MAN IN THE COUNTRY.

VOLUME ONE, BOUND

In Cloth, with Gold Mountings, can be had after Dec. 15th. Price $2.25. Send in your orders at once. Those received in advance will be filled first.

Address,

WESTERN & COMPANY Publishers.

NO. 37 PARK ROW, NEW YORK.

MACHINISTS' SUPPLIES.

LECOUNT'S PATENT HOLLOW LATHE DOGS AND CLAMPS.—A set of eight Dogs from ¾ to 2-in., inclusive, $8. A set of twelve from ¾ to 4-in., $17 30. Five sizes Machinists' Clamps, from 2 to 6-in., inclusive, $11. Send for Circular. C. W. LECOUNT, N 2:1y South Norwalk, Conn.

THE CHALMERS-SPENCE PATENT NON-CONDUCTOR FOR COVERING BOILERS ETC.

Also for protecting Water Pipes and Mains from FROST. This Composition is NON-COMBUSTIBLE. It never DETERIORATES, and will last as long as the boiler or pipe to which it is applied. It saves from 20 TO 30 PER CENT. in fuel according to circumstances. This has been practically demonstrated. Steam passes through ANY LENGTH of piping covered with this Composition QUITE DRY.

Extensively used in the British Navy and by the leading Manufacturers, Shipbuilders, and Steamship Companies of Great Britain and the Continent; and since its introduction in America it has given universal satisfaction. In witness whereof see pamphlet containing names and testimonials, to be had by applying to

THE CHALMERS-SPENCE PATENT NON-CONDUCTOR COMPANY,
Foot of East Ninth street. E. R., New York.

Or, to Branch Office, J. Chalmers, Manager, 1202 North Second street. St. Louis, Mo.; E. H. Ashcroft, Boston, Agent for New England; L. M. Hart, 522 Walnut street, Philadelphia; F A. Shuck, care of Peterson, Mill & Co., 34 Peter's street, New Orleans. nov. 30-tf

NEW YORK BELTING AND PACKING COMPANY. The oldest and largest manufacturers in the United States of

Vulcanized Rubber Fabrics,

Adapted to Mechanical Purposes,

invite the attention of all who are interested in the sale or use of such articles to the high standard quality and low prices of their various manufactures, comprising

Machine Belting, Steam Packing, Leading Hose, Suction Hose, Car Springs, Wagon Springs, Billiard Cushions, Grain Drill Tubes,

etc., etc., etc.,

"TEST" HOSE

made expressly for the use of Steam Fire Engines, and will stand a pressure of 400 pounds per square inch. Officers of Fire Departments requiring new hose, will find this much superior in strength and quality to any other.

PATENT SOLID EMERY VULCANITE WHEELS, a composition of rubber and emery, making a very hard uniform substance of the nature of stone throughout. These wheels for grinding and polishing metals, "gumming" saws, etc., are the most economical and effective tools that can be used.

WAREHOUSE, 37 AND 38 PARK ROW, NEW YORK.

JOHN H. CHEEVER, Treasurer.

☞ Price lists and further information may be obtained by mail or otherwise on application.
oct30-1y-os

E. LYON,

MANUFACTURER OF

Patent Portable Hydraulic Jacks and Punches,

NO. 470 GRAND STREET, NEW YORK.

For Raising Heavy Weights, such as Locomotives Boilers, Guns, Heavy Machinery, Wrecking Purposes, putting together Water and Gas Pipes, pushing off Cranks and Propellers, Pulling, Proving Chains and Ropes, setting up Rigging, or Pulling Stumps, Punching and Shearing Iron, Die-Sinking, etc.

☞ IMPROVED PATENT HYDRAULIC JACKS, that run out their entire length in a HORIZONTAL or any other position.

PATENT HYDRAULIC PUNCH,

For Punching Iron, Die-Sinking, etc. Ap 12;1y

LUCIUS W. POND'S NEW TOOLS.

NEW AND IMPROVED PATTERNS—Lathes, Planers, Drills, Milling Machines, Boring Mills, Gear and Bolt Cutters, Punches and Shears for Iron. Dealer in

IRON & WOOD WORKING MACHINERY

☞ Works at Worcester, Mass. Office, 98 Liberty St., New York.
aug4-1y-os S. N. HARTWELL, General Agent.

BURDON IRON WORKS,

HUBBARD & WHITTAKER,

PROPRIETORS,

NO. 102 FRONT STREET, BROOKLYN, NEW YORK,

MANUFACTURERS OF

HIGH AND LOW PRESSURE ENGINES,

ALSO,

Boilers, Sugar Mills, Hydraulic Presses and Tinmen's Tools of all descriptions.

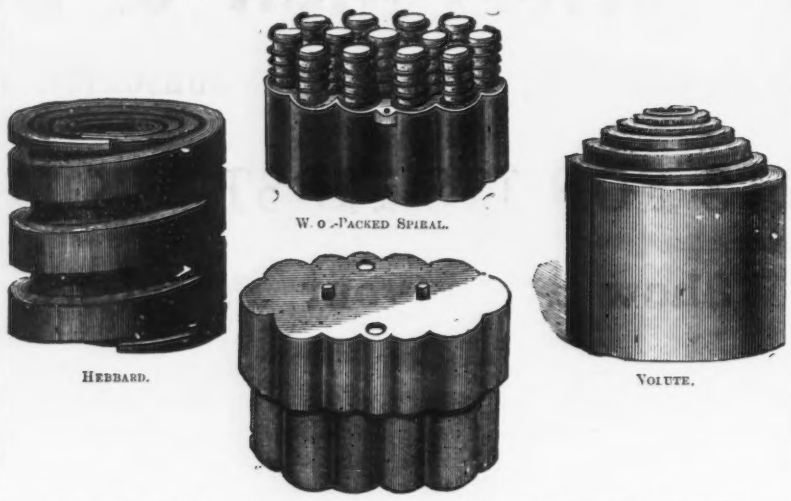
SHAFTING, PULLEYS, AND IRON AND BRASS CASTINGS CONSTANTLY ON HAND.

Ap 12:1y

CAR SPRINGS.

UNION CAR SPRING MANUFACTURING CO.,

4 Dey Street, New York.



W. O.-PACKED SPIRAL.

HEBBARD.

VOLUTE.

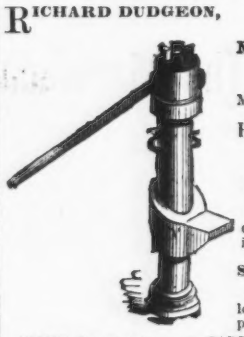
BEST BEARING AND BUFFER SPRINGS AT LOWEST PRICES.

SEND FOR ILLUSTRATED PAMPHLET.

F. W. RHINELANDER, President. S. VERNON MANN, Treasurer. LEAVITT HUNT, General Agent.
Dec.2:6m

MACHINISTS' SUPPLIES.

RICHARD DUDGEON,



No. 24 Columbia st., NEW YORK,

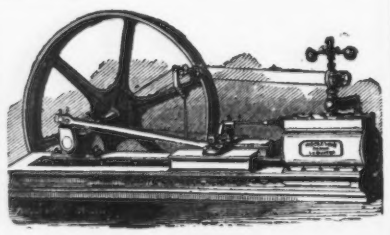
Maker and Patentee of

Hydraulic Jacks AND **Punches,**

Roller Tube Expanders, and Direct Acting **Steam Hammers.**

Communications by letter will receive prompt attention.

JACKS for pressing PINS made to order. CARWHEELS or CRANK May22:1y



TODD & RAFFERTY

GENERAL

MACHINERY MERCHANTS, ENGINEERS, AND MACHINISTS,

Manufacturers of Stationary and Portable Steam Engines and Boilers; also Flax, Hemp, Tow, Oakum, and

ROPE MACHINERY,
MILL GEARING,
SHAFTING.

Lathes, Planers, Drills, Chucks, etc. Iron and Brass Castings. Judson & Snow's Patent Governors constantly on hand.

OFFICE AND WAREROOMS, NO. 10 BARCLAY STREET, N. Y.

Office and Works, Paterson, New Jersey.

JOSEPH C. TODD. oct-27-tf. PHILIP RAFFERTY.

ENGINEERS' SUPPLIES.

Leschot's Patent DIAMOND-POINTED STEAM DRILLS.

The unequalled efficiency and economy of these DRILLING MACHINES are fully established, and they are fast superseding all other inventions for ROCK DRILLING. They are constructed of various sizes and patterns to suit different classes of work, being adapted to Channelling and Gadding in quarries; to Shafting, Tunneling, Prospecting and all open cut work in mines; also to heavy Railroad-grading and Sub-marine Blasting. They operate noiselessly without percussion: and produce a perfectly cylindrical hole of uniform diameter. Their usual rate of boring is three to five (3 to 5) inches per minute in hard rock; eight to ten (8 to 10) inches per minute in slate and sand rock, and eighteen to twenty-two (18 to 22) inches per minute in coal. TEST CORES, in the form of solid cylinders of rock or mineral may be taken out of mines from any depth—not exceeding one thousand (1,000) feet—showing the geological formation, character of mineral deposits, &c. These drills never need sharpening and no steel is consumed in boring—as the cutting points (*composed of rough, uncut diamonds,*) are practically indestructible. Boilers, Engines, Steam Pumps, and all necessary tools furnished with drills. Illustrated Circulars sent on application.

SEVERANCE & HOLT, MANUFACTURERS,
aug11-1y Office, 16 Wall St., New York.

ENGINEERS' SUPPLIES.

RAILROAD IRON FOR MINES.

16 lbs. per YARD.
Stock Constantly on Hand
of any weight and pattern, and sold in lots to suit purchasers. Also, Chairs, Spikes and Fish Joints for same.
DANAS & LITCHFIELD,
(P. O. Box 5489.)
18 WILLIAM ST.,
NEW YORK.
FOR SALE BY
25 320/2240 Tons per Mile.

Light Locomotives, for use in Collieries, Mines, etc.
mch13-6m

WIRE ROPE

MANUFACTURED BY
JOHN A. ROEBLING'S SONS,
TRENTON, N. J.
FOR

Inclined Planes, Mining,
Standing Ship Rigging,
Suspension Bridges, Ferries,
Stays and Guys on Bridges,
Cranes and Shears,
Derricks, Tillers, etc.

A large stock of Wire Rope constantly on hand. Orders filled with dispatch.

☞ For strength, size, and cost, see circular, which will be sent on application. dec26-tf

STEAM ENGINES

FROM 4 TO 500 HORSE-POWER,

Including CORLISS PATENT CUT-OFF ENGINES, SLIDE VALVE STATIONERY ENGINES, and PORTABLE ENGINES. Also, IMPROVED CIRCULAR SAW MILLS, etc.

Send for Descriptive Circular and Price List.

WOOD & MANN STEAM ENGINE CO.,
UTICA N. Y.

Warerooms, 42 Cortlandt Street, New York; and 201 and 203 South Water Street, Chicago, Ill.
nov7-1y-os

GUN-POWDER

THE LAFLIN & RAND POWDER CO., 170 BROADWAY, NEW YORK, deliver Mining, Blasting, and Sporting Powder, from their Agencies in all parts of the United States, and their Works at Kingston, Newburg, Saugerties, and Catskill, N. Y., Pottsville, Carbondale, and Scranton, Pa., Baltimore, Md., and Platteville, Wis.

☞ Safety Fuse at Wholesale. nov 2:1y

GUNPOWDER PILE-DRIVER—THOMAS SHAW PATENT.—The Company are prepared to sell rights, or machines, or will contract for driving piles quicker and better than it can be done by any other machine.

Fifty Blows Per Minute and no Crushing or Shattering.

For description and illustration see this Journal of August 17,th, Vol 8. No. 7. Address
GUNPOWDER PILE-DRIVER,
aug 21-1y o. Nos. 505 Minor street, Philadelphia.

FOR SALE—A FIRST-CLASS 10-STAMP MILL, California pattern, with twenty-five horse-power engine and thirty horse-power boiler, new and in good condition. For particulars and terms, address "STAMP-MILL," care of the ENGINEERING AND MINING JOURNAL. nov. 9:tf. o.s.

MISCELLANEOUS.

FIRE-BRICK.
TRADE MARK.

U. S. Government Standard. Manufactured exclusively by the

Consolidation Coal Company of Maryland.

For Blast, Puddling, Smelting, and Glass Furnaces, and all other purposes requiring the best quality. Diagrams of shapes, and prices will be furnished by the Undersigned. Also,

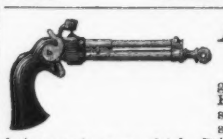
George's Creek Cumberland Coal

by the cargo from the Company's

OCEAN MINES.

C. H. DALTON, Pres. 4 Pemberton Sq., Boston. | J. S. MACKIE, V. Pres. 71 Broadway, New York.

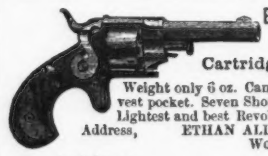
JAMES A. MILLHOLLAND, 2d V. Pres.
Mount Savage, Maryland.
GILMOR MEREDITH,
Dec. 7.tf 25 South Gay street, Baltimore.



AIR TARGET PISTOL,
HAWLEY'S PATENT.

No dirt, dust, nor danger; uses compressed air. From one charging it shoots from five to ten shots, from thirty to fifty feet, accurate as any pistol. Price $3 50. Sent by mail on receipt of price and $1 35 for postage, or by express, C. O. D., and charges. AGENTS WANTED.

P. C. GODFREY,
May 17 119 Nassau street, Room 4, New York.



E. Allen & Co's NEW MODEL **Cartridge Revolver.**

Weight only 6 oz. Can be carried in the vest pocket. Seven Shots, 22-100 calibre. Lightest and best Revolver in the world.

Address, ETHAN ALLEN & CO.
WORCESTER, Mass.
jan4:6m:os

FOR SALE—AN INTEREST IN A GOLD-Bearing Quartz Property, for the purpose of development.

The wall-rock is a talcose slate and the veins are well-defined granular quartz, about two feet in width, showing free gold, and carrying gold-bearing sulphurets and galena. Specimens of the ore may be seen and a further description of the property obtained at No. 33 Wall street, (Room 14) New York. May 17:o.s.

Peteler Portable Railroad Company,

NO. 42 BROADWAY, NEW YORK,

Are now ready to receive orders for Tracks and Cars, and take contracts for Grading, Excavating, etc.

Send for Circular.

1870.

"THE ENGINEERING AND MINING JOURNAL,"

AN ILLUSTRATED WEEKLY PERIODICAL, Intended to advance the interests of those engaged in ENGINEERING AND MINING, in the widest sense of those terms.

VOLUME IX. COMMENCED JAN 4.

ENGINEERING.

It contains matter of the highest importance to all who are engaged in

CIVIL ENGINEERING, as in the erection of buildings the construction of industrial works, public and private, the surveying and laying out of roads, canals, railroads, etc., and the erection of bridges, docks, etc. Being the recognized official organ of the American Institute of Architects, the various papers on subjects connected with building, which are from time to time read before the Institute, will be published in its columns.

MECHANICAL ENGINEERING, as steam engines, hydraulic motors, the construction of tools, machinery, mill-work, etc.

AGRICULTURAL ENGINEERING, as the application of machinery to agricultural processes, and the improvement of agricultural districts by drainage, and various other operations involving an acquaintance with engineering practices.

HYDRAULIC ENGINEERING, as in the planning and construction of water-works, and the improvement of rivers, harbors, etc.

MINING is a subject that receives equal attention with Engineering. The various interests involved in the mining operations of the country, as

THE COAL TRADE,
THE METAL TRADE,
and MARKET REPORTS,

wherever they affect these subjects, are fully cared for, while the principles which relate to mining, geology mineralogy, chemistry, and metallurgy are carefully elaborated, and all new discoveries relating there promptly detailed. In the practical departments relating to the working and management of mines, whether of gold, silver, copper, lead, iron, coal, slate, marble, stone, oil, salt, etc., will be found, not only the latest news, but a full discussion of the best methods of developing these important interests and bringing their products into marketable shape.

The ENGINEERING AND MINING JOURNAL is not strictly a new periodical, as for nearly four years it has occupied a prominent position in the field of journalism under the title, THE AMERICAN JOURNAL OF MINING, which is now presented re-modeled, improved, and in a new and more attractive form.

CONTRIBUTORS.

Among its Contributors will be found some of the ablest men of the day, and no effort or expense will be spared to make the information conveyed, FRESH, TRUSTWORTHY, AND THOROUGH.

ILLUSTRATIONS.

Subjects requiring the aid of engravings will be fully illustrated by cuts prepared by the best artists. Great pains will be taken in this department.

SUBSCRIPTION.

Subscription price $4 per annum, in advance. Any person sending us the names of four subscribers, with the full subscription rate, $16, will receive an extra copy free.

SINGLE COPIES, TEN CENTS EACH.

☞ Specimen Copies sent free on application to the Publishers. Address,
WESTERN & COMPANY,
P. O. Box 5969. 37 Park Row, New York.

News Dealers supplied by the *American News Company*, 121 Nassau St., New York.